# The TROPICAL AGRICULTURIST

MONTHLY.

XXI COLOMBO, FEBRUARY 1st, 1902. No 8.

## PLANTING IN JAVA:

### SUPPLEMENTARY CULTURES IN BY-PRODUCTS.

(Translated for the "*Tropical Agriculturist.*"*)

It is a pleasure to me to follow the honouring invitation of the Sub-Committee of the "Allganeer Syndicaat voor Koffiecultuur en andereberg cultures in Nederlandsch Indie" dated 12th June s.c. in giving a lecture on Supplementary Cultures.

The cultivation of *Cacao* which in the Eastern Provinces of Java may still be considered a supplementary culture is with me and other planters in Central Java a principal culture; I shall, therefore, begin with cacao; if I should have the occasion later on I shall treat successively of Liberian Coffee, nutmeg, randoe ( ? ) with pepper, and the different kinds of caoutchouc, which I know. In 1878 I became administrator of the factory at Djati Roenggo, and had for Superintendent Mr. N. de Vicq de Cumptich. Then already he recommended to the factory not to stop at one cultivation, but to grow also on their lands Liberian coffee, nutmeg, cacao, pepper and karet (?) trees. The factory did not follow his advice; they only ordered 5,000 nutmegs from Banda for Djati Roenggo, which I planted in 1879: I shall return to them later on. Djati Roenggo, he said, with its 1,500 acres can easily bear different cultivations, and he was right; what he would have started nearly a quarter of a century ago, is now done not only in Central Java but also in the Eastern Provinces. I thought this introduction necessary, as I wanted to give the honour to my former chief, who again, about 1886, ordered a new kind of cacao, not being content to stick always to the same red Java cacao, which was cultivated here and there; whether he discovered then already the diseases in cacao tree and pods I do not know, for I did not see him again since 1885. Mr. Van Gogh, who was with me in 1898, had likewise small confidence in red Java cacao; he spoke from experience of cacao estates in Java and the rest of Nedeol, East India, which he had visited, and where the trees were suffering from the Helopeltis pest and the pods from a boring beetle, called Adela, I think. In 1884 I planted 12,000 cacao trees, which remained good till 1895, and since 1888, when I became owner of Djati Roenggo, this estate was successively planted with red Java-cacao. From 1895 until today the two diseases mentioned above kept on spreading.

In 1888 my brother brought me two little cacao plants which Mr. de Vicq ordered from Caracas, under the name of Caracas cacao. In "der Tropenpflanzer," No. 7, year V, you, will find mentioned a kind of cacao growing on the western shore of Venezuela and called Caracas with splendid feeding properties and very rich in fat; further, cacaos from Guayaquil, Bahia, St. Domingo, Trinidad, Granada and Surinam with the same proportion of Theobromine. One of those little Caracas cacao plants died from rajap (?), the other grew luxuriantly and gave beautiful healthy pods, about the size of those from red Java cacao; but the young pods were white and the ripe ones orange.

In 1892 I made nurseries from the seeds and kept this on till 1896. Then the mother tree died, but two Gjangkokans (3) remained, which were sent at my request through the Colonial Bank, one to Ngrangkah and another to one of the Kawi enterprises; both trees are still alive.

* *From the "Nieuwe Gids" of 15th October, 1901.*

What the mother-tree's name is I cannot say with certainty; according to Jumelle it should be a kind of Forestero by the pinkish break of the beans and the more flat form thereof; but, after all, the name does not matter much; only so much I know that by natural crossing of this new kind with red Java cacao a hybrid has developed. This variety grows rapidly and gives an abundance of big fruit. From the 6 to 7 year old trees I get on an average fully *5 catties (=about 7* lbs.) of marketable cacao, a (production) crop which I could not get from Java cacao. Yet, in Siloewok Sarvangan, there are, as the owner, Mr. Ebeling informs me, red cacao trees from 7 to 8 years old which produce up to 6 catties (=8 lbs.) marketable cacao. At Ngoepit, I am told, in a good year, an average of 10 catties (=13⅓ lbs.) of marketable cacao per tree was got from red Java cacao. The seed for my own use and that of other planters whom I supply I take from my plantation of trees of first generation.

Prices of first-class cacao of this kind prepared at Samarang are more than satisfactory; although the nicest and biggest pods were sold for planting; one lot brought fl. 3·50 per picol, (1 picol about =136 lbs.) and another lot fl. 8 per picol more than first-class red cacao. A big sample of this cacao was taxed in Holland, a few years ago, at 2½ cents p. ½ kilogr. (or about Rs. 0·03 per lb.) higher than red cacao.

When I noticed that this variety resisted better the prevailing diseases, I stopped planting red cacao since 1895. Yet, if you plant the Djati Roenggo variety among red Java cacao trees which were suffering from both diseases, then they were also attacked by the paloges (?); but, owing to their more robust growth these trees recover sooner and therefore resist the diseases better than red Java cacao.

In Jumelle's "Le Cacaoier" is stated that in all cacao-producing countries the "Criollo," to which class, according to this writer, also the red Java cacao has to be reckoned, is abandoned and replaced by other kinds of stronger growth. All red Java cacao trees which are poorly and much attacked by Helopeltis, are now taken out and replaced by the Djati Roenggo variety. This variety grows at Djati Roenggo ± 1,000 ft. above sea just as well as at Terwidi ± 1,500 ft., at Assinan and Tlôg. ± 1,700 ft, and at Lcrep about 1,800 ft. high; likewise it answers very well at Silocwok Swangan, ± 75 ft. high, To my idea all kinds of soil, if not too bad, will grow cacao; at Djati Roenggo on a substrate of heavy clay and "padas," at Terwidi and Tlogo on light clay and even sand, red Java and the Djati Roenggo variety answer very well.

Cacao withstands drought well; with an East monsoon of six months' drought, nutmeg and Liberia coffee trees were already fading, while cacao, the red as well as the Djati Roenggo variety were still fresh, and even put on flush; nor did a wet East monsoon damage it at all. On poor and old soil, such as at Djati Roenggo, fully 60 years old, they grow well, of course with liberal manuring. On lands of the Eastern Provinces already ten to twenty years under coffee, Djati Roenggo will still grow beautifully; but after some time you will have to start manuring. If there is no manure to be had in the neighbourhood, one has to keep some cattle. In place of big cattle runs small grazing lands on different spots should be recommended, so as to (simplify) shorten the transport of the manure to the trees. Grass fields should be supplied; kolondjono-grass, a fine fodder, grows rapidly. The cattle should not graze later than 8 or 9 o'clock; afterwards they should be kept in the stable, so as to obtain more manure. The manure of a herd of cattle kept in this way comes to about 10 to 12½ cts. p. cubic ft., and it is good manure. The grazing fields must be fenced in with barbed wire on "randoe" trees which must be high enough to prevent the cattle from eating the highest shoots. In the beginning cacao requires good shading; it grows very well between coffee trees, and within four years supplants both Java and Liberia coffee. While 2-year old plants of red Java cacao have an average height of 4 ft., the Djati Roenggo variety reaches fully 6 ft., and trees of 6 to 7 years old are about 20 ft. high with branches of about 9 ft.; Java cacao of the same age is about 15 ft. high with branches of 7 ft. If you do not plant the cacao in abandoned coffee plantations you may surround it with three or four shoots of dadap or "ketella pohoong" as temporary shading.

The cacao tree reaches an age of 40 to 50 years; there are here still some specimens of red cacao trees fully 50 years old; it is from these trees that the seeds were obtained for the Djati Roenggo plantations. As no dadap can live so long, at least not here, I planted Castilloa trees in between squares of 36 ft. In one plantation of Castilloa of ten years with seven year old trees of the Djati Roenggo variety in between, both are in good condition. On estates which are not exposed to long drought, the cacao, after having once closed, does not want shading any more, but protection from wind should be provided; cacao is easier injured by wind than by sun. Caesalpina dasyrhachis is also a good shade tree, which does not drop its leaves in the East monsoon.

Nurseries are made as for *coffee*, but I plant the seeds directly one foot from one another. The seeds are put only so deep in the ground, that one-half remains above ground, with that end where they were attached in the pod downwards. You may also put them flat on the ground, again to the middle in the ground, but there is this disadvantage, that on heavy clay and with heavy rains the seeds may be covered with a crust of clay which will hinder the upright growth in budding. I begin to lay out pits in April and May, and not later, as I want big plants; the soil here is easy to loosen ("pocteren.") If the soil cannot easily be loosened, one has to resort to baskets or pots of manure, in which you may put the pits in July or August, as I was told by planters who had no fit soil. Other planters start later towards the West monsoon; they put out the plants in nurseries and transplant them into the lands as soon as they have budded. Others again plant directly two or three pits out into the gardens; the different proves which I have taken of this way of planting have given very poor results.

In planting cacao in "pocterans" or baskets the protruding taproot may safely be cut off with a sharp knife. From my own experience I strongly object to planting "Tjaboetans," since a drought of one or two days after putting them out will surely kill the young plants. About pruning of cacao there is no agreement of opinion as yet; I am opposed to pruning; I allow free growth. After the second year shoots come out at the top, at least one; this I keep, as it makes afterwards the continuation of the stem; after a year or so the tree gives another shoot at the top which becomes stem in its turn, so I have trees already three or four stories high.

Other plants again form low on the stem two or three strong shoots, which I keep all; for their formation is, to my idea, a consequence of sickliness in the mother tree; these shoots grow rapidly and the mother tree is cut down.

Only three branches are pruned down after the first or second picking. Other planters allow no shoots, but keep the first three or four top branches, which afterwards spread as with topped trees. I have here a few specimens which accidentally grow like that, but the three or four top branches give too many secondary and tertiary branches, so that their pruning becomes a serious matter; and these branches, must be pruned to render the picking easier.

Picking gives here no trouble; the picking gang, provided with small knives on bamboo sticks, cut the ripe pods easily off, and it happens but rarely that

they pick unripe fruit. It must not be forgotten that cacao is a stem-flowering tree, although the branches bear also a good deal of fruit. Red cacao trees bear for the first time when 3 or 4 years old.; the Djati Roenggo variety already with 2 to 3 years; some trees of this age bear already up to 80 pods The time of development of cacao from flower to ripe fruit is from 6 to 7 months.

The planting distance is here 12 feet, for bed cacao as well as for the Djati Roenggo variety; if the trees should begin to hinder one another, then one tree in the cross is pruned down to that extent that only the crown remains; the amount of stem-fruit on trees thus pruned is amazing. This practice is successfully carried out at Flogo, the only place which I know, where red cacao grows splendidly with but little damage through helopeltis; the trees stand there, as a rule 12 by 12 feet. This pruning should be done with the bursting of the West monsoon.

The cultivation of the soil is the same as with coffee; round the trees must be hacked (gepatjoold), and besides "gebabat" owing to the considerable distance of the plants. (After the trees have once closed, they will themselves kill all weeds, and only manuring is wanted.)

In selecting seed-pods I prefer pods with thin shells and many large pits. Many big pods have thick shells and few but large pits; these I rather reject. (Teysmannia, No. 4 and 5, year 12, page 216.)

### SELECTION OF SEED FOR CACAO.

Mr. J. B. Carruthers, who since some years is busy with investigations in cacao cultivation in Ceylon (there were formerly already some reports anent this in Teysmannia) has made some important experiments about the selection of cacao seed.

He examined fully 300 pods of different sizes, and came to the result that selecting the largest and nicest pods for seed is altogether useless, as the good size of pods is very often due to heavy and thick shells, and that their size is not at all proportionate to the size, number and weight of the seeds on which all depends. A better method to improve the species is to select the trees of which you wish to propagate the seed. Trees which bear abundantly, whose pods contain many and heavy seeds and not much subjected to disease are of course preferable.—*The Tropical Agriculturist*, No. 10, 1901.

The curing is done this way: The shells are taken off in the garden, and the seeds after being "takkered" are fermented in troughs. My fermenting troughs are made of wood and placed in stories one above the other. The fresh seed goes to the first trough and remains there, covered with sacks, to the next morning, when the whole contents are emptied into the second trough twenty-four hours later this trough is emptied in the third and after another twenty-four hours the cacao is washed and left for twenty-four hours under water; after another washing the cacao is dried as quickly as possible. If the cacao should not become perfectly dry in open air (which makes a drying shed indispensable for large production), it becomes mildewy and looses considerably in value. When drying in sheds one has to take care lest the cacao which is of a nice light brown colour, should be spread directly on galvanized iron sheets, as its sour juice in contact with the flak, causes brown spots on the pits which is the more to be feared with the light brown Djati Roenggo than with red Java cacao. To prevent this trouble I have the drying floor covered with cocoa-matting.

About the diseases of cacao I have already spoken in the beginning. The best ways of treatment are now thoroughly investigated in by Dr. Zehntner. In order to learn the results of his investigations planters ought surely become members of the trial station at Salatiga.

Every cacao planter ought, to my idea, become a member; this would reduce to a minimum the cost per acre.

It was in order to avoid all kind of reclame that I did not recommend the Djati Roenggo variety earlier. But as I had been requested to say something on supplementary cultures, I thought it of general interest, to make known the little I know about it.

Mr. du Bois, jr, wishes to draw attention with a few words to the conflicting advices given by different writers concerning the amount of shade which cacao needs. Mr. MacGillawry, he says, would give as little shade as possible. I should not recommend to follow Mr. Mac Gillawry too closely in the Eastern Provinces. In the literature you find. that shade, as a rule, is highly recommended, so that we, at least, are bound to give it our full attention.

The Chairman remarks that his experience coincides with Mr. du Bois. It was always in well-shaded gardens that he found the freshest trees with the healthiest fruit. But, perhaps, the climatological conditions of Djati Roenggo are different.

Mr. MacGillawry mentions the estates of Ngobo, Ngoepit and Groot Getas as instances where a good produce of cacao is obtained with little shade. He has observed that heavy shade decreases the amount of dew; he had even to thin out shade trees here and there. But before all wind-protection must be provided. Referent mentions besides that, if he had to choose between different shade trees, he would give preference to castilloa before cisalpina, as the former gives some little profits.

The Chairman remarks that in the Eastern Provinces cacao seems to be more sensible for drought than in Central Java. Mr. MacGillawry relates, that with him young trees even after two months' drought are still full of leaves. But then he spends fl 16,000 (=Rps 19,200) per year on manure, and manuring begins with the planting. He uses almost exclusively buffalo and cattle manure. His lands are already for 60 years under cultivation, and, at first sight, valueless. The Chairman remarks on the probability that the trees acquire through this a greater power of resistance.

## CINCHONA ON THE NILGIRIS.

(EXTRACTS FROM ANNUAL ADMINISTRATION REPORT ON THE GOVERNMENT CINCHONA DEPARTMENT, NILGIRIS, FOR THE YEAR 1900-1901.)

The area under cultivation on the old estates is 831·46 acres and the area of the first two extensions at Hooker is 160 acres. The total expenditure on the upkeep of these 991·46 acres including the charges for head office was Rs. 50,547-7-3 or Rs. 50-15-8 per acre.

The total expenditure on factory account is detailed as follows:—

| | RS. | A. | P. |
|---|---|---|---|
| Purchase of 167,200 lb. of bark ... | 53,863 | 12 | 2 |
| Machinery and plant ... ... | 29,985 | 2 | 2 |
| Manufacturing and distributing charges ... ... .. .. | 22,785 | 1 | 2 |
| Total.. | 1,06,633 | 15 | 6 |

The balance sheet (statement 15) shows a profit balance of Rs. 41,315-13-7 and statement 13 shows an excess of revenue over expenditure from the commencement of the plantations to date of Rs. 47,861, and, after allowing interest on receipts as well as on charges, the net surplus to date is Rs. 14,43,886.

*Dodabetta.*—The pruning that was done in 1899-1900 proved very beneficial to the trees by admitting more light and air, and during the past year the area pruned was 32·90 acres. This pruning was confined to the removal of the larger branches and extra stems in places where the trees were crowded, and in carrying out this work the importance of maintaining a good crown to each tree was kept in view. It has long been supposed that the leaves of the

cinchona tree constituted the laboratory in which the alkaloids are formed and this conjecture has now been proved to be corrected hy Dr. Lotsy of Buitenzorg, Java. Pruning should therefore be a work carried out with caution and discrimination. In dense plantations the removal of some of the lower branches and extra stems is decidedly beneficial as it tends to the more vigorons growth of the crowns of the trees and admits more light and air to the soil, but where the trees have ample space in which to develop natnrally it may be said that pruning should be left as much as possible to natnre. The difficnlty experienced in recent years in filling np gaps in the plantation with seedling plants, or rather the difficulty in establishing these supplies, has been so great that it was decided to make a trial with stumps of well matnred plants. 36,407 of these stumps were put ont in different parts of the estate in the gaps formed by the removal of old trees, and it is hoped that on account of their more vigorous root system the stnmps will succeed where seedlings failed. Allnsion was made in the last report to an experiment that had been made with the object of ascertaining if the protection of the stems of old trees by means of a covering of grass increased the alkaloidal value of the bark. Bark from a nnmber of the covered stems and from a similar number of trees on the same plot, which had not been grassed, was analysed with the resnlt that the former yielded 6·36 per cent. sulphate of quinine, while the latter gave 5·58 per cent. The increased yield of sulphate of quinine was thus ·78 per cent. Taking the yield of dry bark at 4,000 lb. per acre which is low estimate, the increased number of units obtained was 3,120. The present value of the nnit is 1¾*d.* so that the gross increase in the value of the bark which had been covered was Rs. 341-4 0. The cost of the grassing per acre Rs. 58-2-10 so that the net increase in value amount to Rs. 283-1-2.

The total expenditure on the estate was Rs, 13,806-2-3 or Rs. 42-12-0 per acre. The crop obtained was 68,411 lbs. and the cost of the bark was therefore 3 annas 2·74 pies per pound.

A peculiar condition of the roots of some of the old trees on the estate was observed during the year. The roots were fonnd to he covered with nodules or galls. Specimens of the affected roots were snbmitted to Mr. C. A. Barher, the Governmet Botanist, who reported that they were attacked by the root gall nematode Heterodera Radicicola. This nematode attacks tea and coffee and a large nnmber of wild and cultivated plants, but its presence in the roots of the cinchona tree has not, it is believed been noticed before. The affected trees at Dodabetta do not show any traces of impaired vitality, although it is evident from the condition of the roots that the disease is not of recent date. Pot experiments are being made in order that the effect of the nematode on the cinchona plant may he better observed. Several cinchona stumps on whose roots the galls formed by the nematode were numerous were put into pots and in the same pots healthy cinchona and tea seedlings were planted. At the time of writting the stumps have thrown up healthy shoots and are growing freely and the cinchona and tea seedlings are doing well. The roots of these seedlings will be examined from time to time to ascertain if they have been attacked hy the nematodes from the cinchona stumps. The disease has not been noticed among the old trees at Nedivattam, but the nematodes have been fonnd on that estate in the roots of yonng plants on old land. The young plauts thns affected were stunted in growth and unhealthy in appearance, a condition which was attribnted to exhaustion of soil. It has yet to be proved whether the unhealthy condition of these plants was due to the attack of the Heterodera Radicicola or to the exhaustion of the soil by previous crops of cinchona.

(*b*) *Nedivattam.*—There has been a great improvement in the appearance of the trees on this estate during the year, the result of the more liberal system of cultivation that has been followed in recent years. The good effect of deep digging and the burying of weeds on 129 61 acres was well marked and the pruning of plots 21 and 28, as well as the removal of dead hranches and twigs from the older trees improved the appearnce of the estate. At the commencement of the year the remaining succiruba on plot 2 were coppiced. These trees were the oldest of any on the Government estates, having been planted in 1862, and it is satisfactory to note that at the end of the year the young growth from the stools was healthy and vigorons. The condition of the trees on plot VII which were copiced in 1879 is very satisfactory, and other copiced plots on the estate show very good growth. On the Nilgiris, where the successful replanting of old land is a matter of considerable difficulty, there can he little doubt that the most profitable method of working a cinchona plantation, in order to obtain a sustained yield, is to combine the system followed in Java with that of the copice system. Close planting and gradual thinning out followed by coppicing offers a hetter chance of success than thinning out followed by uprootal of the trees, and a replanting of the ground which is the course adopted in Java. The systems of shaving and stripping seriously affect the growth and vigour of the trees, and although renewed hark is generally richer in quinine than natural bark the yield of quinine per acre over a series of years is greater in the case of thinning and coppicing than by either the shaving or stripping system.

During the sonth-east monsoon 46,400 encalyptus plants were put out on plot XI as an addition to the fuel reserve, but the excessive rain during June, July and Angnst caused a number of the plants to damp off and the planting was not a success. The vacancies will be filled during the coming monsoon with well-grown plants of which a considerable stock is in the nurseries.

The expenditure dnring the year was Rs, 15,279-0-3 or Rs. 48-8-1 per acre. The crop obtained was 64,317 lbs. at cost of 3 annas 9·61 pies per pound.

(*c*) *Hooker.*—The old estate has improved in appearance during the year. All sickly and dying trees were coppiced, dead branches and twigs were removed and pruning was done where it was required. The estate was sickle weeded during the monsoon and dug over before thedry whether set in. The new extensions now consist of 240 acres, of which No. 1 was planted in 1898-9J, No. 2 in 1899-1900 and No. 3 during the past year. The growth of the plants on No. 1 has been rather uneven. Some portions of the 80 acres have come on very well, hut the excess of moistare during June, July and August proved fatal to a certain number of plants. These vacancies will he filled in during the coming monsoon with well-grown plants raised from seed received from Java. Out of the 50 plants on this plot whose height measurements are taken quarterly, three died during the year. The average height of the 47 survivors was 7 feet 3 inches. The tallest of these plants was 10 feet 10 inches. These plants were from 3 to 4 inches high when put out in 1898 and the growth they have made in a little over 2½ years is very satisfactory. The No. 2 extension is more even than No. 1 and promises to do very well. The plants have made good growth and look strong and healthy. No. 3 which was opened during the year promises well. The plants were small when they were put out, bnt owing to favonrable weather in the dry season they have already made good growth. The fonrth extension of 80 acres will be planted in 1901-1902.

The total expenditure on the old estate was Rs. 5,261-3-9 or Rs. 27-2-10 per acre and the crop ob-

tained was 61,686 lbs., the cost of which was 1 anna 4·37 pies per pound. The low expenditure on the Hooker estate is due to the fact that it is managed by an overseer under the orders of the Superintendent of the Nedivattam estate. Taking the .two estates together the expenditure amounted to R. 40-6-3 per acre and the cost of the bark from both estates was 2 annas 7·29 pies per pound.

IV. MANURE.—On the Dodabetta estate 1,875 cart-loads of cattle and stable manure were put out on different plots, at Nedivattam plots 9, 14 and 28 were manured with cattle manure and at Hooker plot No. 1 was thus treated. In the last administration report mention was made of an experiment with a mixture of fish and chemical manures. The mixture consisted of 1 ton fish, 2 cwt. superphosphate, 4 cwt. of basic slag, 4 cwt. of potash and 1 cwt. of sulphate of iron. This quantity was evenly distributed over one acre and lightly forked in. The cost of the manure including the cost of application was Rs. 165-6-4. The stems of the trees were covered with grass at a cost of Rs. 58-2-10, so that the total cost of the experiment was Rs. 243-9-2. The bark of the trees thus treated yielded 6·91 per cent. sulphate of quinine, while the bark from unmanured and ungrassed trees on the same plot gave 5·11 per cent. There was thus an increase of 1·80 per cent. Sulphate of quinine. Of this increase ·78 per cent. may be attributed to the covering with grass, so that the net gain from the manuring was 1·02 per cent. Taking the yield of the acre at 4,000 lbs. there was an increased yield of 4,080 units due to the manure which at the present rate of the unit ($1\frac{3}{4}d$.) represents Rs. 446-4 0. The cost of the manuring was Rs. 185-6-4 and the net gain was consequently Rs. 260-13-8. It was shown in paragraph 3 that the net increase in value of bark from covering the stems with grass amounted to Rs. 283-1-2 per acre, so that the total gain per acre by the combination of manuring and grassing was Rs. 543-14-10 per acre. With a unit of $\frac{1}{2}d$. the experiment would have shown a slight loss, but with a unit of $\frac{3}{4}d$. the net gain would be Rs. 93-14-10.

V. NURSERIES.—At Dodabetta the nurseries did well. There has been no mortality among the seedlings, the seed germinated freely and the young plants are thriving well. At Nedivattam and Hooker the nurseries are well stocked with healthy seedlings. Ten lb. of eucalyptus seed and 1 lb. of grevillea seed were put down in the nurseries in order that there may be an ample supply of plants for the fuel reserves. The Java Ledger grafts referred to in last year's report are doing well in a sheltered position on No. 2 extension at Hooker. No attempts at grafting were made during the year and it is doubtful if the succirubra seedlings will be large enough to graft upon in 1901-1902. There is a good stock of these seedlings in the Nedivattam nurseries and as soon as they are sufficiently well grown experiments in grafting will be made. $48\frac{1}{4}$ lbs. of seed were sold during the year at the rate of Rs. 4 per pound. The amount of officinalis seed sold was only $8\frac{1}{4}$ lbs; the largest demand was for hybrid seed of which $22\frac{1}{2}$ lbs. were sold and the remaining $17\frac{1}{2}$ lbs. was succirubra seed.

VI. CROP.—The total quantity of bark harvested during the year was 194,414 lbs. or 54,135 lbs. in excess of the previous year's crop. The actual cost of harvesting and drying this crop was Rs. 2,678-1-0 as shown in statement 3 or 2·64 pies per pound. The crop included a large quantity of bark from prunings. On Dodabetta the result of pruning 32·90 acres was a yield of 36,933 lbs. of bark or 1,122 lbs. per acre. The bark from branches of officinalis trees does not contain more than about 2 per cent. of sulphate of quinine; but although this is a very small yield it can easily be shown that in the Government estates with a quinine factory at hand it is profitable to harvest such bark when the market value of the unit is high. With branch or other bark costing only 2·64 pies per lb. to harvest and analysing 2 per cent of sulphate of quinine the cost of each unit is 1·32 pies. Bark analysing 1 per cent. would cost 2·64 pies per unit. The present price of the unit in the London market is $1\frac{3}{4}d$ or 21 pies. When pruning is being done the quetion arises whether or not to harvest the branch bark, and in this connection it has to be borne in mind that although the cost of the unit of quinine in such bark may be very low the cost of manufacture per unit or per lb. of quinine is, roughly speaking, four times as high in the case of 1 per cent. bark as in the treatment of 4 per cent. bark. The following statement shows that when the price of the unit in the london market is $1\frac{1}{2}d$ or higher it is profitable to harvest even 1 per cent. bark when it can be delivered at the factory at the low rate of 2·64 pies per unit:—

| — | One per cent. bark at 2·64 pies per unit. | Four per cent. bark at $1\frac{3}{4}d$ per unit. | Four per cent. bark at $1\frac{1}{2}d$ per unit, |
|---|---|---|---|
| | RS. A. P. | RS. A. P. | RS. A. P. |
| 100 lbs. bark cost .. ... | 1 6 0 | 43 12 0 | 37 8 0 |
| Manufacture of 100 lbs. bark costs ... ... ... | 10 0 0 | 10 0 0 | 10 0 0 |
| Total cost ... | 11 6 0 | 53 12 0 | 47 8 0 |
| Cost of 1 lb. sulphate of quinine ... .. ... | 11 6 0 | 13 7 0 | 11 14 0 |

The year's crop of 194,414 lbs. consisted of 144,106 lbs. crown and hybrid barks and 50,308 lbs. red barks. The total cost of the crop was Rs. 48,147 which was the whole expenditure on old plantations and head office and the cost of each pound of bark was therefore 3 annas 11·54 pies. The amount of bark purchased during the year was one 167,200 lbs. which cost Rs. 53,863-12-2 or 5 annas 1 85 pies per pound. Statement 7 shows that at the commencement of the year the stock of bark was 305,822 lbs., while at the end of the year the stock was 350,404 lbs.

VIII. FACTORY.—The total quantity of bark worked up in the factory during the year was 316,469 lbs. consisting of 292,069 lbs. crown and hybrid barks and 24,400 lbs red barks. The alkaloids extracted from these barks were $7,648\frac{1}{2}$ lbs of sulphate of quinine and 2,972 lbs. of febrifuge or a total of $10\,620\frac{1}{8}$ lbs. The output was $4\,182\frac{7}{8}$ lbs. less than in the previous year, the reduction in the quinine output being $2,539\frac{7}{8}$ lbs. and that of febrifug 1,643 lbs. The consequence of this reduced output has been an increase in the cost of the products obtained during the year.

At the close of the year 1899-1900 there remained a balance of $14,400\frac{3}{8}$ lbs. of quinine and 13,213 lbs. of febrifuge in store. The issue of quinine and febrifuge during 1899-1900 were $7,378\frac{1}{4}$ lbs. and $2,676\frac{1}{2}$ lbs. respectively, so that with a normal demand there was in store about two years' supply of quinine and five years' supply of febrifuge. In these circumstanses the opportunity was considered favourable for taking the preliminary steps towards a radical change in the working in the factory. No fusel oil was purchased during the year, and the sum provided for its purchase was utilised in procuring an entirely new and up to-date quinine manufacturing plant. The, reserved stock of fusel oil was used for manufacture and although it was found that there was not a sufficient stock of this oil to manufacture 10,000 lb. of quinine, it was considered better that the large stock of quining should be drawn upon than that an extra supply of oil should be procured. The oil to be used in the new factory is shale which

is very much cheapear than fusel oil, but the machinery in the old factory is not adapted for shale so that when the stock of fusel oil ran out the manufacture of quinine had to be suspended. The introduction of the new machinery, which is now in course of erection, was not practicable without some interference with the work in the old factory but it is confidently expected that the saving effected by the introduction of new and improved machinery will amply compensate for the extra cost of the quinine and febrifuge made during the past year. The quantity of bark purchased during the year from private growers was 167,200 lb. and the price paid was Rs. 53,863-12-2 or As. 5-1·85 per lb. The outtern of sulphate of quinine from this bark which was of poorer quality than that purchased in 1899-1900 was 2·78 per cent. so that the price paid for each unit was As. 1-10·24. The average price of the unit in the London market during the year was 2*d*. In 1899-1900 the average cost of each pound of bark purchased was As. 5-2·13 and the cost per unit of sulphate of quinine was As. 1-6·16. The estate crown and hybrid barks (including the bark from Bikkatti) which were worked up amounted to 124,869 lb. These barks yielded 2·39 per cent sulphate of quinine, the average cost of the bark was As. 5-4·57 per lb. and the cost of each unit of sulphate of quinine was As. 2-3. The poor quality of the bark is explained by the fact that th greater portion it was from sickly and dying hybrid trees copiced at Hooker and Nedivattam prior to 1899-1900. The high cost per pound of bark is owing to the small crops taken in 1897-98 and 1898-99 and this high price taken together with a low quinine yield raised the cost of the unit per pound of bark and the cost of the quinine. At the time when bark was to be purchased at ½*d*. per unit it was considered advisable to husband the resources of the estates by taking small crops. The consequence was naturally a high price per pound for the bark harvested in those years. If this high priced bark had been worked up at the time when cheap bark was being purchased the average cost per pound and per unit of all bark worked up would have been low, but as it has been manufactured when bark was purchased at a comparatively high figure, the result is an increased cost per pound of quinine. It is purposed to so regulate the cost of the estate crops in future with reference to the price paid for purchased bark that there may be no great fluctuations in the cost price of the quinine from year to year. When the market price of bark is high the plantations should be made to yield a large crop a low cost and this low-price bark should be worked up with the higher priced purchased bark. When bark can be bought cheaply, a smaller crop of more expensive bark can be taken from the plantations and worked up with the cheaper purchased bark. During the past year the cost of the quinine in the crown and hybrid barks used in the factory was Rs. 12-8 6 per pound before manufacture.

## BANANAS UNDER IRRIGATION.

STRUCTURE—The banana is a herbaceous plant, that is, the stem is composed of green, fleshy matter, as opposed to the woody substance of a tree. The true stem is underground, as in the great family of lilies, to which the banana is closely allied. What we call for convenience sake the stem is composed of the bases of the leaf stalks.

THE TREE CUT OVER.—When a banana tree is cut over, we can clearly see the method of its formation. Taking from the centre and working out, we find leaves tightly rolled up, or in the case of more mature trees the continuation of the flower stalk: then what appear to be cells, but are really intercellular spaces, enclosed by walls made up of cells proper. These spaces increases in size as we approach the outer part of the treo.

LEAVES.—The leaves are long sometimes as long as fifteen feet, with a distinct channel down the middle. They come out of the stem rolled up as we have seen, unfold, and in the case of the earlier leaves, finally break down and dry up; their bases going to make up the stems. In the earlier stages of its growth the tree sheds off the outer coverings formed by the bases of its earlier leaves, as it increases in girth.

THE FLOWER.—The flower comes out from the stem, from what is generally called the heart, in appearance just like a cob of corn. It is enclosed in an envelope or spathe, which envelopes the whole blossom. Immediately prior to the appearance of the flower, indeed almost immediately simultaneously with it, we see a short leaf, from one to four feet long, which seems designed to hang over the bunch and protect it from the direct rays of the sun.

THE HANDS.—The first spathe fallen, we see a bract concealing at its base the object of most interest to the planter, the first hand. This consists of the female flowers, as do its successors in varying numbers according to the size of the bunch to be. Bract after bract drops off disclosing hand after hand, this process continuing till the bunch is ripe. Taking a nine-hand bunch as an example we find, the first nine-hands composed as has been stated, then two or three hands of hermaphrodite flowers; and then a succession of pollen-bearing flowers. These may easily be recognised by noting the difference in length between the ovaries, or apparently solid green parts at the base of the flowers.

FERTILIZATION.—This arrangement of the flower seems to make cross fertilization certain; as, when the pollen-bearing flowers are exposed nearly all the upper flowers are past the stage when they can be fertilized.

FRUIT.—Any description of the fruit would be unnecessary, except to state that many fingers contain undeveloped seeds. In some cases, these seeds are no doubt fully developed, and experiments are being made as to the possibility of raising different varieties from seed, with a view to improving the productiveness and general utility of the banana. One point of interest in connection with the fruit is that at first they stand out at right angles to the stem and afterwards turn up.

ROOTS.—The root is fleshy, containing little fibre. Hence we see the importance of a free open soil. It branches little. The branches are covered with fine, hair-like rootlets, which are the feeders. Cutting the ends of the roots tends to increase branching, and to increase the number of hair-like roots, and therefore the feeding powers of the root system. The underground stem or bulb is a white mass, composed of fibre. From this are given off the suckers by which the plant is propagated. In their earlier stage, these suckers feed on the parent, at the same time putting out roots for themselves; and when the parent is cut down feed on the reserve laid up for them in the bulb. Such then is a general description of the plant. The Botanical Department have 21 varieties of the banana growing at Hope Gardens. That cultivated in Jamaica is the Martinque variety.

SOIL.—In his "Text Book of Tropical Agricultnre," Dr. Nicholls gives the composition of the best soil for bananas as follows:—

| | | | |
|---|---|---|---|
| Clay | .. | .. | 40 Per Cent. |
| Lime | .. | .. | 3 ,, |
| Humus | .. | .. | 5 ,, |
| Sand | .. | ... | 52 ,, |
| | | | 100 |

This he classifies as a rich loam with lime. The banana will, however, grow on very poor soils, producing inferior bunches; some containing only three fingers. The soil described above would be free and warm, two qualities indispensable for the

best growth of the plant. Good drainage is a necessity. Wherever stagnant water is present, the leaves take on a reddish-yellow appearance the bunches are inferior, ripening before they fill out properly; and the whole structure of the plant is weakened.

CLIMATE.—The banana requires a good supply of moisture and a good deal of heat for its proper growth. Well sheltered valleys are very suitable. While it thrives best under such conditions, it will also grow at a considerable height above the sea, though in such cases taking longer to bear.

SANTA MARTHA.—I had an opportunity some three years ago of seeing what may be called a banana planter's Paradise. This was at Santa Martha, Republic of Columbia. Imagine a stretch of level land, a free soil, rich in vegetable matter accumulated through centuries of luxuriant growth, an intense heat, frequent showers of rain, and a wind-break in the shape of a mountain range running up to a snow-capped peak 17,000 odd feet high—this is a place not to grow bananas, but for bananas to grow themselves! Acres upon acres with not a broken leaf what a contrast to this wind-swept irrigation district of St. Catherine? Immense trees with huge bunches met the eye on every side. One part in particular struck me very much. For about three months in the year, irrigation is sometimes needed. This is necessary to be kept in mind in order to understand what follows. The main plantations are situated at Rio Frio, where at the time of my visit about 800 acres were in cultivation.

A few miles further inland, a piece of land was thought suitable for cultivation without irrigation; and about 250 acres were planted out. I saw some mahogany logs taken from this land. They averaged four feet in diameter, by about 16 feet long. One crop was taken off, and then a long spell of dry weather set in, with the result that the cultivation went to pieces and was abandoned. Some two years after, seasonable rains having fallen in the meantime, the land was inspected. When I visited the place, a gang of labourers were busy bushing out the tangle of weeds that had sprung up, and thinning out the tremendous growth of banana suckers. Huge bushes hung all around, and everything promised for as heavy a spring crop as one could desire—and this without care of any kind. A planter there told me that two-thirds of the bunches were cut in the spring months, as a result of the natural growth of the bananas. I should think it possible to bring in 90 per cent. of the crop in these months Lest anyone should feel inclined to pack off bag and baggage to Columbia. I might mention that on the other side of this very bright picture there is the spectre of revolution, with its consequent stoppage of trade. Thank goodness we have peace and quietness here, if we have not such rich land.

CLEARING LAND.—On the system of cultivation to be followed depends the method of clearing the land. Everything is cut down, as shade is detrimental to the banana, causing an undue growth of stem and leaves and a poor bunch. The wood and brushwood are burned or carried off. This leaves the stumps, which will hinder the use of the plough and cultivator; but where hand cultivation is to be followed, the stumps are rather an advantage as their gradual decay keeps up the supply of humus in the soil, and assists drainage.

STUMPING.—Where the plough and cultivator are to be used, it is really better and cheaper to stump the land from the commencement. This sounds rather formidable, but it is after all easier than digging the stumps after the lapse of a few years, the weight of the tree helping to uproot itself. A relative of mine who settled some fifty years ago in New Zealand described to me how he uprooted a large tree to make room in his garden. Choosing the side of the tree which appeared to be the heaviest, he cut off the larger roots on that side, thus removing the support. Tracking out the larger roots on the other side, which now had the strain on them, he began cutting through them. Very soon the strain proved too much; there was a rending of roots, a tremendous crash, and there lay the tree with its roots in air, leaving behind it a hole large enough to contain a cart and horse, at a small expenditure of time and labour, considering the size of the tree.

COSTA RICA.—A Costa Rican planter told me that he merely cut down the forest and burned off the lighter wood, leaving the rest to rot. This plan, however, could only be followed where the natural conditions favour the quick rotting of the wood. It is to be preferred where practicable, as it adds a very large amount of humus to the soil, which would be lost where burning is rescrted to.

PLANTING Cleaning up being finished, the land is lined for planting. Where irrigation is used, it is usual to follow the lay of the land for convenience in irrigating. Various distances apart are used, 7·6 x 7·6, 8 x 8, 6 x 10, 7·6 x 15, 12, x 12, 14 x 14, 15 x 15, 16 x 16, 24 x 12 being the favourites. Various opinions are held as to the most economical distance at which bananas should be planted. I think the planter should be guided by circumstances. Where a method such a 7 6 x 15 is adopted, I would recommend that the wider distance should run north and south, so as to admit the sun. My own experience shows that in establishing bananas in hot land, close planting is the best method, say 8 x 8. Once the bananas are established, every other row can be taken out leaving them 8 x 16.

HOLES.—I have found it advisable, when the land, has not been ploughed, to dig fairly large holes, say 18" x 18" x 12", so as to give the suckers a good start.

SELECTION OF SUCKERS.—The selection of suckers is a most important point, and one which will repay closer investigation than it has hitherto received, as on this depends the vigour of the young suckers and in a measure the strength of the stool or root. Selection of seed, cutting, stock, and bud will always repay the careful cultivator. Small bulbs contain little nourishment for the growth of the young suckers; very large bulbs throw up too many young suckers; which are apt to be weak. I have found true eye suckers from six to eight months old to give the best results, as they generally possess very vigorous eyes and contain a large amount of nourishment, possibly that which would go to make the final bulk of the tree, and part of the material from which the bunch is formed. Where the centre sucker is allowed to grow, fair bunches may be looked for, which is not the case where indifferent suckers are planted. Then again, a quicker return will be got, entailing a lessened cost of upkeep in cultivating, weeding and watering.

SPLIT SUCKERS.—Personally, I have never tried planting split suckers, but do not consider this a good method. I have seen half an acre planted this way, the results not being satisfactory.

POSITION OF SUCKERS.—The suckers are generally placed upright in the hole. Some lay them in slanting, even right on the side. This, too is a method hardly to be recommended as the natural growth of a sucker is to turn up, and not to grow straight up from the eye. Then when the eye sucker has exhausted the nourishment in the bulb, the latter, or the greater part of it, rots off, leaving a hole. This makes the stool liable to damage from wind, as it weakens the hold on the ground. The earth is raked into the hole, and preferably over the sucker, so as to protect it from the drying influence of the sun, and consequent loss of moisture. The soil should be moist when planting is being done. If, however, dry weather prevails, and the suckers are found to be slow in making their appearance, irrigation may be started, care being taken not to put on too much water, which is apt to rot the bulbs.

TRENCHING.—Trenching should immediately follow, or even precede planting, so that the young suckers may not suffer any check to their growth from want of water. The method of laying out a field for irrigation is very simple. A main trench is dug from the point of intake, and led along the highest

part of the land; sub-mains branch along the minor ridges, giving off smaller mains and twigs where necessary. Care should be taken to run the twigs, so that the water may thoroughly wet the soil without saturating it unduly; and also that the water should not run so quickly as to scour the land. Forcing the water along the twigs should be avoided, as it leads to ponding, which is detrimental to the plants and a waste of water; besides settling the soil and making æration faulty. Various methods of overcoming minor difficulties will suggest themselves by practice.

Santa Martha.—In Santa Martha a different plan is adopted. The land is divided into squares by means of banks, the squares being larger or smaller as the land is flat or slopes sharply. The upper squares are filled with water, which is then allowed to run into the next set, and so on to the lower part of the field. This is really flooding the land, and is apt to cause water-logging. This system is called "catch-work" irrigation. The object of irrigating is to put sufficient water on to the land to supply the plant with water and to render the plant food in the soil soluble and so available to the plants. Any water put on in excess of the necessary quantity is, I take it, wasted, is apt to wash out, through drainage, part of the plant food from the soil, and to deteriorate the carrying qualities of the fruit. It is therefore important that a method should be followed which will enable the planter to wet the land without bringing it to the saturation point, and to ensure that, the water being put on, it is not evaporated too quickly by the action of the sun and wind. This brings us to the important question of cultivation.

Accumulation of Alkalies.—Before dealing with this, it may be well to point out that with intensive cultivation there is some danger of the rising water in the soil leaving behind it on the surface an excess of salts which will prove injurious to vegetation. In the more extreme cases, such lands are known as "alkali lands." For full information on the subject, I would refer you to the "Bulletin" for March 1901. The remedy for such a condition is good drainage, and an occassional excess of moisture, such as we get during the May and October seasons. Danger from this source is hardly to be apprehended in this district, however, though in one case it actually occurred to my knowledge. This was on a piece of land recently taken up, which from its location was naturally adapted to the accumulation of alkalies. A cure was affected by digging a deep drain at the lower end of the field, thorough ploughing, and a free use of irrigation water. The water in the drain ran brakish for a time. In such a case it is of course highly necessary to stop the application of excess water as soon as the accumulated salts have been washed away. Continuation of the process beyond this point would result in washing away much valuable plant food.

Cultivation.—The object of cultivating the soil are to destroy weeds, to loosen the soil to admit air and moisture, to keep the soil at a fairly even temperature, to admit the free passage of roots, to assist drainage and the escape of surplus water, and to assist the retention of moisture in dry situations.

Weeding.—The prevention of the growth of weeds is an important point, as every weed, however, small, is busily engaged in pumping up water from the soil, and robbing the cultivated plants of the moisture and mineral substances which are absolutely necessary for their growth. Where cultivators are not in use, the hoe is the most useful implement for the purpose; but the use of cultivators will be found cheaper and better, besides giving better results as regards yield and quality of fruit.—*The Journal of the Jamaica Agricultural Society.*

*(To be concluded.)*

---

## IMPORTATION OF INDIAN ORANGES.

The late Minister for Agriculture, Mr. C. Sommers, having submitted to the Department of Agriculture the following paragraph relating to the famous Sylhet orange of India, the matter was referred to Mr. Despeissis, the viticultural and horticultural expert of the department, whose report also follows:—

Our orange-growers should endeavour to obtain seeds of the famed Sylhet orange. Dr. Bonavia, in the *Gardeners' Chronicle*, says that this fine variety is grown solely from seed in Eastern Bengal, and is sent in large numbers to Calcutta. The tree is an upright grower, the fruit is of the loose-skinned kind and of fine quality. At Shalla, amongst the hills, there was an orange-garden of about 1,000 acres, and one might walk for a good hour or two, always under the shade of orange trees, without reaching the limits of cultivation. Ripe oranges of this variety were sent from Lucknow to England, and although the fruits decayed on the way, the seeds remained fresh; they were sown, and a number of plants were the result. The seedlings fruit in five or six years. As the Sylhet orange is to be had in many parts of India, there should be no difficulty in obtaining seeds, and there seems no reason why this variety should not do well in Australia.

Oranges grown from seeds, seldom reproduce without alterating the characteristics of the parent plant, the flowers being often cross-fertilised by bees and other insects. The "Sylhet" of Calcutta is, however, one of the varieties which show fairly constant results when raised from seeds. The Director of the Botanical Garden at Calcutta, would, I dare say, undertake to forward to this Department a few cases of Indian oranges, and also a Wardian case with plants raised from layers from trees noted for the excellence of their fruit, or raised by budding on seedling trees. There are several varieties of Indian oranges I would like to see introduced, and a case each of the following varieties could be shipped to Western Australia. The fruit should be carefully picked and clipped at the stalk and not pulled; it should be well coloured, but not fully ripe, and should be free from punctures caused by thorns or, by scale insects. The cases should be firmly packed and each fruit wrapped up in tissue paper three or four days after picking, so as to rid the rind of any surplus moisture, and thus minimise the chances of bruising. These oranges would be about 18 days in transit, and should land in good order at Fremantle.

(1.) The "Sylhet" of Calcutta, derives its name from the station of that name in the Khosia Hills of Eastern Bengal, where it is said to be generally propagated from seeds. The "Sylhet" is a tall upright tree and belongs to the "Santolah" group of loose-skinned oranges; as does also.

(2.) The "Nagpore" of Bombay, which is much like the "Sylhet;" the tree of this variety however, is of a spreading habit. Both are excellent varieties for exportation.

(3.) The "Santo'ah," a very small but extremely sweet orange, which grows wild in the hot, humid part of india, between the Himalayas and the Ganges. Naturally, it requires very little attention. It is sweet almost before it is quite yellow.

(4) The "Keoula" greatly recommended on account of its lateness. Long after the oranges have been gathered the "Keoula" hangs on the tree, when it turns a beautiful dark red colour and only then becomes sweet.

(5.) The "Mussembi" brought from Poona and sold in Bombay. It is said it can be left to hang on the tree for a whole year without hardly deteriorating. The fruit is orange yellow, and shows longitudinal furrows from stalk to eye.

The Minister having approved of the expert's recommendation, the Secretary of the Department of Agriculture has communicated with the Director of the Botanical Garden, Calcutta, to procure both fruit and plants of the varieties enumerated in the above report, and ship them to Perth.

On arrival of the fruit they will be submitted to leading growers and dealers, and thus an opportunity will be afforded of comparing some of the most famous oranges from oriental stock with the varieties from Portuguese origin mostly cultivated in Australia.—*Journal of the Department of Agriculture of Western Australia.*

## THE EFFECT OF FORESTS ON THE CIRCULATION OF WATER AT THE SURFACE OF CONTINENTS.*

The whole of this subject is exceedingly complicated, because it depends largely on a number of elements liable to vary widely within narrow limits of time and place. It is thus difficult to frame any rule of general application, and for the present the enquiry must be limited to defined localities in the hope that a large number of observations continued for a long series of years, and the progressive improvement of scientific methods, may eventually permit of their being combined into one harmonious whole.

The subject, "circulation of water at the surface of the soil," must be understood to include movements in the atmosphere, as well as in the soil and on its surface. The water in the soil may be more or less stagnant if the subsoil strata are level and impermeable.

It may now be considered a fact that large forests in the plains do indeed act like hill ranges as regards the precipitation of moisture.

Numerous experiments carried out by the Ecole Forestiere of Nancy in the Foret de Haye, by M. Fautrat in the forest of Halatte, by M. de Pous in the forest of Troucais, also in Germany, Austria, Russia, and even in India, show clearly tha more water falls on forests than on the open lands adjoining. The difference is not very great, but may be 12 to 20 per cent.

The additional height due to the trees seldom exceeds 130 feet, and is often only half as much. The effect is nevertheless noticeable. Throughout the year, but especially during the moisture seasons, the forests evolve a considerable amount of humidity into the atmosphere, and so render valuable assistance to the surrounding crops. If this were visible as fog, it would be seen that apart from wind, each forest gives rise to a moist and cool layer extending, as shown by ballooning experience as high as 4,500 feet. Resinous species liberate more water than broad-leaved ones. The tree crowns prevent a portion of the rain from reaching the ground at all. This quantity instead of being carried away by the streams, is re-evaporated and passed on further in the atmosphere, and so does double duty. Sooner or later this mass of moist air meets a current at a different temperature, and the result may be that the same water falls a second time as rain in a different place. Hence a country possessing a fair share of forests can pursue agriculture under much more favourable conditions, and a country without forests, like the Deccan, Central Asia, and parts of America, is in a fair way to become a desert. Consequently the creation of forests in the plains is hardly less a measure of expediency than in the mountains, and the expediency is greater when the plains have naturally a light raiofall. Engineers, even of eminence, especially if interested in irrigation, will dispute this, but they do not know everything any more than foresters do, and the foresters' side is the side of safety. The question divides itself into two parts, plains forests and hill forests. In the former the benefits desired are largely atmospheric, in the latter they are rather in the direction of protecting the soil itself and of regulating the flow.

### I.—PLAINS FORESTS.

What becomes of the atmospheric precipitations?—

(*a*) part is retained and evaporated from the trees, &c.,
(*b*) part is evaporated on or in the soil,
(*c*) part flows away along the surface and streams,
(*d*) part soaks into the soil up to saturation point,
(*e*) part is absorbed by plants for their growth and transpiration,
(*f*) the remainder sinks to lower levels, where it either forms subterranean reservoirs or percolates till it again comes to the surface as springs.

Calling R the total rainfall—

$$R = a+b+c+d+e+f.$$

On a level plain there is no surface flow, and the equation becomes—

$$f = R - (a+b+d+e.)$$

In the simplest case, that of a perfectly bare plain, *a*, *c*, *e* becomes zero, and the equation is

$$f = R - (b+d.)$$

Of all these factors the only one that can be measured with any-thing like accuracy, is the portion *a* evaporated off the trees. Even this factor, according to the Mariabrnnn observations, is liable to very considerable errors of determination, since no two rain-gauges will give the same readings even under the same tree. It is necessary to employ a large number of rain-gauges, including some embracing the trunks of the trees. Even employing 20 rain-gauges, totalling 10 square feet of opening, the probable error is at least 1 per cent. of the fall. The measurements should be made either (1) foreach individual shower, (2) for a long series; (3) by grouping the showers according to their intensities.

It has been found in Europe that a broad-leaved forest prevents 1 to 3 tenths, and a conifer forest as much as 5-tenths, of the total precipitation from reaching the ground at all. But these figures hold good only for those localities where they were obtained. In countries where the rainfall is heavy and continuous, the forest soil in any case will be about as thoroughly watered as a bare soil.

All the other fractions, *b*, *c*, *d*, *e*, *f*, composing the total fall, are still very undetermined in forests and other lands alike, and they vary so much with every possible local difference that they are hardly likely ever to be capable of satisfactory measurement.

Reasoning from the known facts that, in spite of obstruction by the crowns, the forest soil is as well watered as the soil outside, and that the evaporation in a forest is much less as proved by the greater moisture of the surface soil; it was supposed that forests contributed more than anything else to the maintenance of subterranean supplies (level plains are still referred to). The results obtained in Russia, therefore, came as a great surprise. Soundings taken during the growing season (1st June to 1st September) inside and outside the forest of Chipoff (Government of Woronej) showed that the water level below the forest was some 32 feet lower than outside. In the Black forest (Government of Khersòn) the level was some 12 to 16 feet lower. Presumably these figures are extremes for the following reasons—(1) the measurements were taken at the season when transpiration is greatest, (2) they were made in localities where the rainfall was only 12 inches in the year, where there was as a probable natural consequence of the dryness an almost complete lack of natural forest, and where consequently the forest would have to pump all it could in order to maintain itself. An increase of forest area would probably reduce the necessity for so much pumping by the roots. The experiment was repeated by M. Ototzky much farther north, under the 59th degree of latitude, in the Government of St. Petersburg, where the climate is cooler and moisture and the rainfall averages 20 to 30 inches. The subterranean water is plentiful, yet again, the forest lowered the level, but this time only by 20 to 46 inches. In order to check the Russian results, an experiment has been started by

* Derived principally from an article by M. E. Henry in the *Revue des Eaux et Forets.*

the French forest officers in the forest of Mondon, near Luneville. It is a level forest of about 5,000 acres situate on a low plateau formed of alluvial sand gravel and pebbles. Eleven sound-holes were bored, in 1899, six in the forest and five outside. The water level was found to be lower in the forest by 6 to 64 inches during the season of active growth. This result confirms the Russian observations and accords with the known facts concerning the action of forests in drying up swamps and *stagnant* subsoil waters.

Nevertheless it would be a great error to jump to the conclusion that plains forests always and in all countries lower the level of subsoil waters. It has in fact been shown by Mr. Ribbentrop that near Trichinopoly wells, 6 to 10 feet deep inside the forest, held water throughout the dry season, whilst the river beds and wells, 15 feet deep outside, were dried up. Each locality must be studied under its own conditions. In a general way it may be said that plains forests render service of various kinds:—

(1) They dry up swamps and malarious places, as, for instance, the Landes, the Sologne, the Pontine marshes, and many others.

(2) They suck up from great depths water which is otherwise not utilisable, and cause it to again circulate in the atmosphere where it forms fresh rain.

(3) They do not injure the springs, since there are none in level plains where man is obliged to have recourse to irrigation. They may lower the subsoil water level to a degree which is seldom serious if the rainfall is enough to be of any practical use to the crops.

(4) They cool and moisten the air and render showers more frequent during the growing season.

### MOUNTAIN FORESTS.

A rainfall chart bears a great general resemblance to a contour or relief map, the more the hills, the more the rain. In reality the rainfall is more complicated. All mountain chains show rain maxima, and these maxima are very generally proportionate to the elevation. There is more rain at 6,000 feet than at 4,000, more at 4,000 than at 2,000, and so on. Even small elevations suffice to attract an appreciable maximum. Wooded mountains are still more effective, especially in the summer months. Mountain forests are mostly coniferous, and conifers exercise an influence even more powerful than that of broad-leaved forests. A forest is always covered by a great layer of moisture which is there none the less, though it is not visible as mist. Whence comes all this vapour? Is it due to evaporation from the leaves, or is it produced by some action of the millions of points of the pine needles? Science cannot tell, but the effect is certainly not due to transpiration alone. Transpiration is indeed less active in conifers than in broad-leaved species, and it would consequently be expected that the former would give rise to a smaller layer of invisible mist than the latter, but the contrary is the case. The cause must therefore be sought in the soil or in some other unknown factor. One cause may be the soil, but another is surely to be found in the greater portion of the rainfall that is intercepted by conifer crowns. It was shown in France that in 1876 the conifer forests intercepted and restored to the atmosphere over 100,000 cubic feet more water per acre than the broad-leaved forests. Other years have given even greater differences, and there are no means of making exact measurements, but there is no doubt that wooded mountains attract more rain than bare ones.

In all Europe, Spain is the country that gets least rain. Notwithstanding the great mountain chains running up to 10,500 feet in Grenada, Murcia, &c., the rainfall of July and August is not half an inch. If these mountains were wooded instead of being absolutely bare, the South-east of Spain would not suffer so much from drought, and the country would not have had to deplore the disastrous floods produced in Murcia by the Segura. Spain is at last awake to the fact, and has undertaken a series of reboisement works, an account of which was read at the international Congress of Sylviculture of 1900 in Paris by M. Ricardio Codorniz, Chief Engineer thereof. There is plenty of moisture in the sea breezes, but nothing to condense it on to the hot mountains. In the mountains the rainfall is divisible into the same kinds of fractions as in the plains, with this difference, that the proportion of surface flow, being zero in the plain, becomes considerable on the mountain. The quantities *a*, *b*, *d*, *e*, may first be examined. The quantity *a* has not been directly determined, and the plains results cannot be quite applicable on account of the preponderance of snow, and the great differences of intensity and distribution. The evaporation from the soil surface *b* must be less than in the plains, because the temperature becomes lower as the altitude increases. For the same reason the water fixed in or evaporated by the plants, *e*, is also less, as may be verified by the proportion of ashes. The growing season is shorter and heat less great. Consequently the transpiration is less and the quantity of organic matter formed annually per acre is smaller. At Aschaffenburg (400 feet) a thousand beech leaves will cover about 35 square feet, while at 4,000 ft., near the upper limit of the species, the same number of leaves will only cover about 9 square feet. The percentage of ashes and the total weight are also less, being 4·03 per cent. for beech and 3·58 per cent. for spruce, against 9·91 and 10·19 respectively. Even the grass at high levels contains one-half less ash than in the valleys.—*Indian Forester.*

*(To be concluded.*

## THE FERMENT OF THE TEA LEAF, AND ITS RELATION TO QUALITY IN TEA.

*(Continued from page 452)*

### EXTRACTION OF THE FERMENT.

Their discovery in the present instance was doubtless much delayed by the presence of the large amount of tannin in the tea leaf, which makes it difficult, if not impossible, to extract the ferment unless special means are used to previously removes this tannin. My final method was as follows:—A known quantity of leaf (10 grams of fresh or 6·6 grams of withered) was ground up to a pulp, and then hide powder (5 grams) was added and the mixture thoroughly ground together. This hide powder has the faculty of removing the tannin from the liquid in which it is present. When a known quantity of water was added, therefore, the tannin having been removed from solution by the hide powder, the enzyme was allowed to exude into the liquid. After standing for two hours the whole mass was pressed through cloth, and all the extractable part, at any rate, of the ferment was obtained in the liquid thus squeezed out. On the addition of alcohol the enzyme was deposited as a slimy mass, which on being again dissolved in water and filtered, gave a clear liquid containing the ferment required. If it was wished to determine its quantity use was made of the fact that on addition of "guaiacum resin tincture" a blue colour was produced, and by measuring the intensity of this blue colour the relative quantity in two similarly prepared solutions could be ascertained. Further it was found that all the enzyme thus extracted was by no means equally active, and that it could be divided into two parts one of which gave the blue oxidation product with "guaiacum resin" alone, and the other only in presence of a small amount of hydrogen proxide In this report I have called the former of thes "active enzyme," and the whole present, includin

the latter, "total enzyme," thongh probably a part of this does not exist ready formed in the leaf, and may hence be known as "zymogen" or "pro-enzyme."

OXIDISING ACTION OF THE FERMENT.

After isolating these snbstances the first question wonld natnrally be as to what effect they have when added to fermenting tea leaf. The experiment was therefore made, and it was fonnd that the leaf colonred more quickly in their presence and at the same time the colonring proceeded normally. The same happened if tea jnice instead of tea leaf was taken. It may therefore be taken that the ferment which I have isolated does play a part in the fermentation of the tea. This was confirmed by its action on several other easily oxidisable snbstances. Pyrogallic Acid, for instance, coloured (*i. e.*, oxidised) with great rapidity in its presence. Hydroqninone did the same. So that we have here an oxidising enzyme or oxidase, present in the tea leaf, capable of causing increased rapidity of fermentation in the tea, and capable of oxidising varions easily oxidisable snbstances like Pyrogallic Acid and Hydroquinone.

EFFECT OF HEAT, &C,. ON THE FERMENT.

The next point appeared to be to ascertain the effect of heat npon this oxidase, especialiy as this has an important bearing on the temperatnre necessary to stop the fermentation at the commencement of firing. It was found that a temperatnre of 160-165°F. had no appreciable effect in three minutes, that at 176°F. the oxidase was partly destroyed on the same time, bnt it was not till over 180°F. was reached that the ferment was completely destroyed in this period. On the other hand its activity is considerably modified at a mnch lower temperature. I conld not ascertain the precise point at which it ceased to be effective, bnt while very active at 13C°F., it was mnch more feeble at 143°F., and donbtless at a very short distance above this it ceased altogether to exercise its fnnctions. It is therefore absolntely necessary that the whole of the tea in the drying machine (and not merely the machine, thermometer, which is a very different thing be raised considerably above 150°F. immediately on pntting in the firing machine, and to ensnre the destrnction of the ferment at least 180°F. shonld be reached. This is of conrse what is attained in the best practice, bnt the reason and necessary for it become obvions when considered in the light of the above observations.

The effect of varions chemicals on the oxidase was next considered. It acts best in slightly acid soln-tion, bnt if this acidity be increased especially with mineral acids, beyond a small amonnt, all action ceases and the enzyme may be destroyed. ·4 per cent. of Sulphnric Acid in a liqnid was snfficient to absolntely destroy the ferment at once. ·04 per cent apparently hindred all oxidising action. To organic acids snch as those which occur in tea juice it was much less sensitive, and 3 per cent. of Acetic Acid were required to destroy it in 2 honrs. Alkalies were less effective, bnt here 3 per cent, of Ammonia or Canstic Potash were sufficient to practically destroy the active part of the enzyme after fonr and a half hours. The resnlt in mannfactnre of these observations I have not as yet been able to ascertain. Whether it may be wise or practicable to make np the leaf to a certain definite acidity, being the point at which the ferment was most active, before fermentation, one cannot at present say. It is well known that Hydrochloric Acid added to the roll softens and weakens the liqnor,* bnt in this case the acid itself is objectionable, and we have no record of the amonnt added. This is a matter for experiment.

* See Tea Notes. A. F. Dowling, 1885.

DISTRIBUTION OF FERMENT IN THE FLUSHING SHOOT.

If the various leaves on a flnshing shoot be taken, the amonnt of enzyme is by no means the same in every part. The fresh leaf, for instance, contains abont an eqnal amonnt in the nnopened tip leaf and in the stalk, bnt below the tip the percentage decreases in every leaf. Taking the leaf as plncked, for instance, on a China-hybrid bnsh in September, the following table gives the relative amonnt present in each leaf separately, calculated both on the fresh leaf and on the dry matter in the leaves (taking that in the tip leaf as unity):—

| | Active Enzyme. | | Total Enzyme. | |
|---|---|---|---|---|
| | On fresh leaf. | On dry leaf. | On fresh leaf. | On dry leaf. |
| Unopened tip leaf .. | 1·00 | 1·00 | 1·00 | 1·00 |
| First open leaf .. | ·64 | ·65 | ·64 | ·61 |
| Second open leaf ... | ·48 | ·48 | (·80 ?) | (·80 ?) |
| Stalk ... ... ... | 1·13 | 1·64 | ·95 | 1·39 |

These fignres apparently seem to indicate that where the largest qnantity of enzyme is present; the best tea is made, and yet not wholly so, becanse the stalk, which is objectionable in the tea, contains as mnch as any part. The reason of this is seen however if the relative amount of acidity, of tannin, and of phosphoric acids in the same samples of these leaves are taken. These give the following figures:—

| | Acidity. | | Tannin. | | Phosphor Acid. | |
|---|---|---|---|---|---|---|
| | In fresh leaf. | In dry leaf. | In fresh leaf. | In dry leaf. | In fresh leaf. | In dry leaf. |
| Tip unopened leaf .. | 1·00 | 1·00 | 1·00 | 1·00 | 1 00 | 1·00 |
| First open leaf ... | ·94 | ·94 | 1·03 | 1,03 | ·88 | ·88 |
| Second open leaf.. | ·94 | ·94 | ·91 | ,·91 | ·75 | ·75 |
| Stalk ... | ·47 | ·70 | ·59 | ·86 | ·55 | ·79 |

It therefore appears that, where a large amonnt of enzyme is combined with the greatest acidity, and with the greatest amonnt of tannin, there the tea prodnced is the best. Such is only a preliminary conolusion, and it mnst strictly be considered applicable to similar conditions. It is, however, one to which the next set of experiments gives support.

RELATION OF FERMENT TO QUALITY.

Several gardens were taken in the Darjeeling District. A produces average or rather better than average Darjeeling tea; B has for many years prodnced absolntely the best tea in India; C is during the present season giving the highest priced prodnct in the district. Conditions being therefore as near as possible eqnal, the qnality, if the above condition be trne, shonld vary according to the amonnt of enzyme present, provided the same amonnt of stalk, or approximately so, be present in the samples. Comparing, first, garden B with garden A. B No. 2 is from a young Assam or high hybrid extension giving very fine tea; B No. 2 is from a low level Assam extension giving the worst tea on the garden, bnt yet an above-average qnality; B No. 3 is from China tea giving an exoellently flavonred prodnct. Determining the enzyme present in each of these samples in September 1900, and comparing the amonnt with that in A (China hybrid plant), we have, taking A as unity.

| | Active Enzyme. | Total Enzyme. |
|---|---|---|
| A ... | 1·00 | 1·00 |
| B No. 1 ... | 1·88 | 1·30 |
| B No. 2 .. | 1·17 | 1·32 |
| B No. 3 ... | 1·83 | 1·32 |

In this case the active enzyme seems therefore to be a fair measure of the quality-producing character of the leaf. The same result is shown on garden C, as follows:—

| | Active Enzyme. | Total Enzyme. |
|---|---|---|
| A .. ... | 1·00 | 1 00 |
| C No. 1 .. | 2·17 | 2·18 |
| C No. 2 ... | 1·44 | 1·68 |

Here C No. 1 represents the very highest quality Assam bushes, and C No. 2, similarly, the best China plants in the garden. In C No. 1, probably a little larger amonnt of stalk occurred, but A and C No. 2 are absolutely comparable, and here it will again be seen that flavour in the tea follows the enzyme in the leaf. Hence one may, I think, conclude that, other things being equal, the flavour in the product is materially connected with the quantity of oxidase in the leaf from which is made. This conclusion, as stated above, will have to be supported by many more experiments before one can consider it satisfactorily established, but in the meantime there is strong and consistent evidence of its substantial accuracy.

How then can this oxidase be increased in the leaf? In a table on page 8, it was shown that, taking the various leaves on the same stalk, the amount of phosphoric acid varied very closely with the amount of oxidase. In addition to this I have, in a previous report,* brought forward very strong evidence that the "quality" of tea is materially influenced, at any rate in Assam, by the amount of phosphoric acid, and especially of available phosphoric acid, in the soil. Now not only is phosphoric acid present in greater quantity in the leavs on the same stalk which give the most enzyme and produce the best tea, but also there appears to be most of this constituent in the soil of those gardens giving leaf containing the most oxidase, and making the best tea. The following figures for the soil of the gardens A and C, where the leaf mentioned above was obtained, show this very clearly.

| | A | C |
|---|---|---|
| Percentage of Phosphoric Acid in Soil | ·061 | ·124 |

The conclusion drawn in my previous report above mentioned, that in order to obtain high quality tea, there must in any case be a large quantity of phosphoric acid present in the soil, is here confirmed, and this phosphoric acid becomes, in addition, apparently connected with the quantity of enzyme in the tea leaf.

INCREASE OF FERMENT DURING WITHERING.

One method by which the amount of oxidase present in the leaf may be, and is normally, increased, must not go by unnoticed. Withering has usually been considered to mean partial drying of the leaf at a low temperature so as to make it fit for rolling—and no more. My experiments show, however, that it has a fair more important function, which may explain to a certain extent the failure of artificial methods by artificial heat to give a wither of the best kind. During this process, in fact, the amount of active ferment materially increases, in some cases by as much as 80 per cent. of its original amount. Taking the leaf from gardens A and B above, the following increase took place during withering, due allowance having been made for the loss in water during the process, and taking the amount in the fresh leaf from Garden A as unity.

* Tea Soils of Assam and Tea Manuring-November 1901.

| | ACTIVE ENZYME. | | TOTAL ENZYME. | |
|---|---|---|---|---|
| | In fresh leaf. | In withered leaf. | In fresh leaf. | In withered leaf. |
| A ... | 1·00 | 1·81 | 1·00 | 1·69 |
| B No, 1 | 1·88 | 2·48 | 1·30 | 1·87 |
| B No. 2 | 1·17 | 1 88 | 1·32 | 1·87 |
| B No. 3 | 1·83 | 2·19 | 1·32 | 2·19 |

The increase in active ferment hence varies from 20 per cent. to 80 per cent. of the amount originally present, and this accounts very well for the fact that leaf rolled fresh without withering will never colour like properly withered leaf.

CONCLUSIONS.

What practical conclusions can therefore be drawn from the investigations which have just been described? Will it be possible to prepare this enzyme, and at a time when the quality of the tea is inevitably low to add it to the fermenting leaf in order to improve the flavour? This may be so, but is, to say the least of it, very doubtful. It must always be remembered in discussing the value of the presence of any ferment whatever, that it is not only the ferment which is of importance, but also the substances to be fermented. And in all vegetable products the growth of the material to be changed is coincident with that of the enzyme which is to change it. This is, for instance, the case in leaves or in seeds containing starch. So soon as starch appears, there also appears the diastase which is to transform it into sugar. This is the same with other ferments and fermentable substances. It wonld therefore not seem likely at first sight that by merely adding the ferment alone from outside any great improvement would be effected. But, so far, we are in ignorance what the substance is by which flavour is produced. The property may reside in the tannic acid, but this there is every reason to doubt, though of course to that constituent we do owe undoubtedly the purgency of the tea. It may be due to some changes in the resins, in the pectins, or in other products of the leaf of more or less obscure character. What these are and how they are changed will form the next step in this investigation.

For the present it has been established—

(1). That the fermentation of tea is independent of living organisms, and is caused by an unorganised ferment or oxidase which can be extracted from fresh or withered leaf.

(2). That the qnantity of this oxidase is greatest in the tip leaf of tho shoot, and becomes less and less in the leaves as one descends from the growing point. It occurs in two forms, one more active than the other.

(3). That the oxidase acts best in a slightly acid juice, but excess of acid destroys its power, as well as any free alkali in the liquid in which it works.

(4). That it is materially increased during withering, and hence this process has a very important function in tea manufactnre, independent of its necessity in making the leaf fit to roll.

(5). That, given leaf of the same character, the quality of the tea produced varies with the amount of oxidase, the larger the amount of oxiase the better being usually the qnality of the tea

(6). That the amount of oxidase in the leaf is, in some way not yet known, dependent on the amount of phosphoric acid in the soil.

The work here detailed was done principally on the Moondakotee Tea Estate, Darjeeling, and to the manager, the agents, and the owners of that garden, I must here tender my heartiest thanks for help in every direction. To the Reporter on Economic Products to the Government of India, my thanks are also due for the use of his Calcutta laboratory in connection with this work.

## CACAO CANKER IN CEYLON.

*(Continued from page 444.)*

### SPORE DISTRIBUTION.

The spreading of the spores over an estate is a most interesting, and the most impotant, question in relation to the canker, and has received a great deal of thought and attention from me, as it is by means of the spores that all the increase of the disease comes about. Though I have seen cases of infection from pod to stem and *vice versâ* by actual contact, these cases are so rare that we can neglect them and consider that the spores are responsible for all the extension of the disease.

The methods of infection of different trees are very various, but we can distinctly point to three or four chief means of attack which have been constantly observed. In the first place, the wind has no doubt the largest share in spreading the spores, especially over large distances, and it is the wind which enables the disease to spread from estate to estate. Instances of this may be mentioned. In one case an estate was chiefly and first attacked at the point nearest to a native garden which had been entirely killed out by canker, and the trees allowed to remain after they were dead, a prevalent wind blowing from this direction. Cases similar to this are numerous. On the other hand, the disease is often absent from sheltered hollows, even though there were present all the conditions which favour it, because the wind passed right over and not through the cacao.

The next and nearly as important an agent is water—both rain and river. Rain washing down the trees and dripping off the pods on to other pods or parts of branches and stems carries with it the spores from infected places, and leaving them causes fresh spots. I have seen a tree covered with a mass of small fresh diseased places, all independent of each other, below an old patch of canker which was covered with spores. There have been many and clear proofs of rivers spreading the disease. In some cases, I fear, by the dead timber being thrown into the stream and conveying its deadly cargo to other places lower down; and also a number of instances of cases of flood washing the spores over a flat area of cacao and infecting the trees. A very clear case of this was found in one young clearing, where practically every tree was cankered just above the surface of the ground, where a few inches of water had stood for a short time during a flood.

But, in addition to both wind and water, ants and other small animals are the means of spreading the disease to an extent that I think is hardly recognized. Any one who has watched the ceaseless activity of ants in running over stem, branch, and pods of cacao tree cannot fail to see how they must be the means of carrying from one place to another the spores when they pass over them. I have examined the legs and bodies of some ants which had been travelling over a tree having spores on its bark, but without discovering these spores on them. But, considering the extremely small size of the spores, this does not materially weaken the contention, and, indeed, I should have been surprised if in any of the few cases I examined I had discovered any spores. The fact that the ants frequent the pods, where they feed on the secretion from the backs of the white *Coccidæ* that live on the juices of the pod, alone makes it probable that in the case of the pods the ants are responsible for a good deal of damage in carrying infection.

How much part the pods take in spreading the canker in comparison to the stem and branches it is very hard to determine, but the rapidity with which the fungus grows in the pods, produces its spores, and spreads to other pods and to the bark leads to the supposition that in many cases the majority of the damage is due to the disease in the pods. It is unfortunate that in most estates the time when the largest number of pods are on the trees is the wet season, which is most favourable to the fungus, and a suggestion may be offered in this connection. It is well known to cacao planters that the amount of fruit produced by each tree at the different crop times varies, that one tree produces a bigger spring crop and not so big an autumn one as another; this is an individual characteristic, which is in many cases quite pronounced. If such characteristics are carefully selected in propagating (as has been done to produce the early and late varieties of cereals and many other cultivated plants), a plantation may be formed which will, in normal seasons, habitually produce its largest yield of fruit in the spring, when the dangers of attacks of fungi are much less, and when the planter has the advantages of sun in ripening his pods and curing his seeds. By continually using seed which has been produced in the spring, no doubt this would be gradually done; but it would be more effectually and quickly brought about if the planter would observe for a year or two those individual trees which bear their fruit more in the spring, and by using the seed from them get in time a spring crop variety. The attention of planters might also with reason be drawn to the practice of grafting, which Mr. Hart of Trinidad has shown to be practicable in cacao, and which would, without doubt, lead to most interesting results.

### TREATMENT OF CANKERED TREES; CUTTING OUT CANKER.

Before proceeding to discuss methods of prevention and cure—which are in this paper the most important matters to be dealt with and laid down —it is necessary to understand under what conditions fungi of the nature of this canker fungus grow and spread.

The fungus grows in the stem, branches, and fruit of living cacao trees, and cannot grow for any length of time on dead portions or on the leaves or roots of the tree.

For the growth of a spore of a fungus certain conditions are necessary: heat, moisture, and air. In Ceylon there is always enough heat, at any rate in the cacao-growing areas: air is present, but moisture enough is not always found. In dry weather there is not enough moisture, unless under a heavy shade, for spores to grow, consequently they dry up and in a majority of cases perish. In wet weather and under heavy shade spores alighting on cacao stem, branch, or pod will grow and produce an infected patch. The fungus growing in the bark takes some months before it produces its spores and can affect other trees on the pods; these are formed in two or three days. We therefore have to direct our efforts for prevention and cure to removing diseased tissue before the spores are produced on it, and to reducing as far as possible the conditions under which the spores of fungi can germinate on the surface of the bark.

In my last report published in the end of 1898, nearly three years ago, certain rules were laid down for prevention and cure. These have been carefully and continuously carried out on one or two estates, partially on a good many others, very spasmodically and half-heartedly on others, and in a large number—in unfortunately the largest number—of cases, especially those estates in native hands, no means whatever have been adopted to stop the canker or prevent it producing spores to the danger of all other cacao.

If this Circular has no other effect than to induce cacao growers, as a whole, to take concerted measures against the spread of the disease, it will have fulfilled a useful purpose. Some three years have therefore passed—a sufficient time to judge of the benefit of the measures adopted.

The first rule laid down for treatment of the canker in stem and branch was "the whole of the

diseased tissue and a wide margin should be entirely excised." This has been carried out on many thousands of trees. I have personally visited more than forty estates where disease is prevalent, and on many of which trees have been so treated, and from observations jotted down in my field note-books I estimate that in practically all cases where it was carried out carefully the disease has been entirely eradicated at that spot. In a proportion of the cases the treatment led to the death of the tree, as the canker had grown for so long in the bark and permeated so large an area that cutting it ont left no connection at all between the roots and the leaves of the tree, which is essential to life.

The cost of this treatment has naturally varied on different estates according to the amonnt of the work and the skill with which it has been done by the coolies, also natnrally accoding to the amount of canker existing in each estate treated. The maximnm amount spent in this work on a peviously badly cankered estate has bcen less than Rs. 15 per acre in a year, and in the majority of cases a much smaller sum than that. Such work, the only insurance possible agaianst damage in an estate at present free from canker, sbould cost under Rs. 3 per acre in the year.

In considering this matter of cnrative means two things must be remembered: First, that the presence of mycelium does not always show itself by a discolouration. The brownish and claret colours are only produced when there is an immense amonnt of the mycelium of the fungus in the tissne. In the early stages of a diseased patch the chance in colour of the tissue is almost imperceptible, and the absence of discolouration must not be taken as meaning absence of the fungus mycelinm. Second, the mycelium may be present in suoh qnantity as to cause a patch of distinct discolonration, but the tissue surrounding this patch also contains mycelium, though in less qnantity. If, however, this is left behind, the patch will spread again. It is thns essential to cnt a wide margin round the discoloured spot of at least 2 inches. I have observed many patches cut out partially, *i.e.*, all the claret colour taken away, which a few weeks later showed signs of living and spreading mycelinm at the sides. Even when the patch has been vigorously and carefully treated the tree shonld be some weeks later again examined to see that the fungns has been entirely removed.

A seoond element of danger which requires care is the habit of the fnngus—previonsly mentioned—of penetrating to the old wood of the tree growing np behiud the bark, rnnning longitudinally along the tree, and cropping out at another place above or below the initial patch. This has been on one estate most carefully searched for and eradicated in a way that reflects great credit on the aptness of the cooly to carry ont skilled work when tanght well how to do it. The mycelium can be detected in the wood behind a patch of canker as a black line about the thickness of a piece of thread, whioh rnns sometimes for more than a foot up or down the etem.

Tbree years' trial of cutting out cankered patches in cacao trees in Ceylon has, I think, proved to all observers that this method of dealing with the disease is at once practicable and efficient. When one comes to examine carefully cases of cankered patohes said to be cut out and still spreading, the explanation, as a rule, is that the fungus mycelium was not entirely removed, or that a fresh inocnlation by a new spore has begun the canker at the same place or near it.

### Treatment of Cankered Trees: Shaving.

The cutting out the caukered tissue entirely was, however, too drastic and too expensive a cure for some planters, as in some badly diseased estates it would have killed a large proportion of trees, and in my reports of 1898 I recommended as an alternative method, though not promising such good results, the shaving of the affected parts and allowing the shade to be light enongh for tbe sun to dry up these shaved parts. This has proved snccessful, bnt as was expected not so entirely snccessfnl as the more thorongh cntting out. In cases of estates where shade was light and the snn got free access this light shaving has freed the trees from disease in more than 50 per cent. of the cases treated.

The explanation of the snccess of this method of shaving in eradicating canker is that the mycelinm of the fnngns is cnt, broken, or brnised at conntless places by the shaving knife (or what is still better for quickness and clean work, the spoke-shave), and with the drying effect of the snn on the tissues it cannot recover itself, and dies. Thongh many of the cells of the bark are killed, a portion of them are active below the snrface, and the tree does not suffer very seriously from the operation.

If this treatment is carried ont nnder dense shade or in damp weather, the effects are seldom good, and in the majority of cases the fungns is not eradicated. Some interesting experiments have been bronght to my notice of an artificial heat being applied to the shaved surfaces, charcoal braziers being held within a few inches of the newly-shaved snrface, and the results of this were almost as marked as direct sun light.

I tried this process on a small scale on four trees, and in the parts shaved and scorched (one of which was 13 inches by 10 and nearly encircling the tree) the mycelinm was killed, and the bark tissnes were not entirely killed, so that in a short time the trees recovered entirely from the disease.

Though this "hot potting" is almost equal in its results to the effect of the sun, it is not so good, becanse it is too local; and nnless very carefully carried out there is too mnch scorching, and the tissnes are damaged to a great extent. The experiment is, however, interesting, as showing the *modus operandi* of the cure after shaving. The moisture is dried np, and the mycelinm of the fnngus cannot get snfficient snpplies of nonrishment to counteract the great damage done, while the plant tissnes below, which are nnhnrt, drawing their snpplies eventually from the root, gradnally recover.

### Treatment for Pod Disease.

The eradication of the canker in the bark is of vital importance, bnt of no less importance is the removal of diseased pods. As was stated previonsly the fungus spreads and prodnces its spores ten times more rapidly in the soft tissue of the pod than in the bark, so that prompt measnres mnst be taken if the spreading of the canker fnngns by means of the pods is to be prevented. All diseased pods, however slightly affected, shonld be at once removed and the husks bnrnt, or if that is impossible during wet weather, buried withlime. By this means a very great, if not the greatest, source of infection is destroyed, and no loss accrues to the estate, as the valne of the pods (even though nnripe) with a small patch of disease is greater than a few days later, when they are entirely diseased and the seeds also blackened. The nnripe and partially diseased seeds prodnce "black cacao" bnt the pods which are left till the disease has spread entirely over them are often unfit even for "black cacao."

The simplest method of carrying out this important work is to have all diseased pods, however little affected, collected when the ripe pods are being plncked, and to send ronnd at periods between the plncking times, and have any which have since acqnired the disease taken away. In this way no pod conld remain on the tree diseased for more than four or five days. This could be done at a very little cost.

All these preventive and curative means, cutting out, shaving, and destroying diseased pods, should be done during the dry weather as far as possible,

though they should not be entirely stopped when the rainy seasons are on. In dry weather the disease on the bark is comparatively easy to detect, while when the stems and branches are wet the slightly darker appearance on the outside of the bark is masked; and further, the sun and dry air being most important agents in the destruction of the fungus, any work done while the air is highly charged with moisture is less likely to be effective.

OTHER REMEDIES.

Various other remedial and preventive means have been tried by myself and others, which should be mentioned here. The desire of the planter is generally for an application either to the tree or to the soil which shall cure or drive away the evil he fears. This is natural, and the wish is shared by cultivators in all parts of the world. The object of cure however is, in the first place, to be as far as possible absolutely effective; and in the second place, practicable in regard to its cost and probability of carrying it out faithfully. In dealing with cures and preventions in Ceylon for cacao canker we must attempt to get some method which, while effective, is simple, and requires a minimum of skill and apparatus.

The vaule of Copper Sulphate either by itself or mixed with lime as in the Bordeaux mixture has long been recognized by all who are interested in sanitary work for plants. This substance is the best deterrent of the growth of spores, and if a covering could be continuously kept on the surface of stems, branches, and pods, no new patches would occur. But in the dry weather (when the blue stone if applied will stay on) is a time when spores can seldom germinate, as there is little or no moisture which is necessary for them. If the application is made in rainy weather it is washed off by the next shower, and it would be impossible to keep the tree covered with it. For these reasons, while blue stone is an excellent preventative, the benefits gained in the case of cacao canker would not be commensurate with the cost of application.

Another favourite remedy is the application of tar, either to the outside of the tree before cutting and shaving or to the cut surfaces. This a most treacherous method, as it deludes the planter into a false security. The fungus not being entirely removed, the mycelium grows vigorously underneath (in some cases I have seen spores produced and breaking through the tar), so that it prevents second examination to see if the fungus has been exterminated. It is often therefore a coverer of bad work. In some cases cow dung has been applied to the cut surfaces. This also is harmful, as it keeps the part damp, harbours spores, and conceals the place, when it should be again examined.

Many cultivators favour the application of lime —thrown on dry—to the trees and on the ground beneath them. The drawbacks to the application of blue stone apply also to lime as regards the part of the plant above ground. In regard to its effects on the soil, while in some land it has beneficial manurial qualities, its effect as a fungicide is limited. Spores do not grow on dead leaves or on the ground. I have tried to cultivate them on both, but though if kept moist they germinated, they did not persist. It is therefore almost superfluous to take any measures against spores lodged on the ground or on dead leaves and other débris. We have seen that the fungus does not affect the roots, and the effect of lime in the soil does not help the tree in its battle with the canker fungus or make it any less liable to attack.

PREDISPOSITION OF TREES TO DISEASE.

The question of liability of cacao trees to infection by the canker fungus has caused a good deal of misunderstanding with regard to the question of the disease.

In the case of the cacao canker, I stated in my second report of 1898, and it seems well to repeat it, that "No special predisposition of the tree is necessary for the attack of the fungus." There is a belief, which is very general both in Ceylon and other lands, that all diseases of plants can be prevented by keeping the plants in a high state of health and vigour. This is true of many diseases, and the opposite is also true in some cases that excessive quantities of nutrition taken up by the root predisposes to certain diseases. Every specific disease, *i.e.*, disease in which an animal, fungus, or bacterium is the prime factor, must be considered by itself, and no general law as to lack of health predisposing to disease is accepted by plant pathologists.

In the case of cacao canker, my observations over thousands of acres of cacao in all parts of Ceylon, from Rambukkana to Moneragalla, at all elevations and aspects and on all soils, show that cacao in all conditions of vigour contracts the canker, provided the spores are there and conditions present to allow them to germinate. There are many instances of "shuck" cacao adjacent to more vigorous trees with the disease equally prevalent on both, and there are cases of the best cacao suffering while some adjacent poorer trees for some reason have escaped.

Mr. Marshall Ward, now Professor of Botany at Cambridge, found this equal liability to be the case in the coffee leaf disease, and it has probably since come under the observation of many readers of this Circular that this leaf fungus attacks equally both healthy and "shuck" coffee. In his report on the leaf disease (1882,) Professor Ward says: "No special predisposition on the part of the coffee is required for its infection, and no other conditions are necessary to the spore than moisture and the presence of air, &c., as with any germinating seed."

In order to further test the truth of my observations in regard to this question of predisposition, I sprayed four trees of old red cacao which were showing all signs of abundant health, and four others shuck and ragged. Only seven out of the eight acquired the disease, and one of the healthy ones was not affected, for the reason, I believe, that it was more exposed to air and sunshine and the spores were dried up.

It is important to grasp this fact of the vigour of the cacao tree being no safegurard against the canker, as, if the planter does not realize it, he may be neglecting to take any precautions or keep any look out for the enemy which does not spare the best trees.

The question of predisposition of unhealthy trees leads us to the consideration of the possibility of obtaining a variety of cacao which would be immune or less liable to canker than those now grown. When canker first appeared it was held by some that the *Forestero* variety was to a great extent immune. It is a hardier breed than the old red, and stands wind, drought, and all other inimical conditions better than the red variety, but it has not been attacked markedly less than the red by the canker, and experiments of inoculation show that it is equally liable.

Whether a variety will be found that will be "disease resisting" or not cannot be said, but it is a search well worth the while of the cacao planter, and in prosecuting it some facts should be remembered. The pod disease is a most important factor in the spread of canker, and when pods are produced in the rainy season, they are more liable to acquire canker. A variety, therefore, which produces and ripens its fruit during the dry months will have a certain protection from disease owing to its time for bearing fruit "dodging" the dangerous season. The typical *Forastero* green pods have a thicker epidermis, and this gives a partial protection against canker spores.

In selecting seed for breeding a variety of cacao which will be "disease resisting," the characters to use are thick skinned pod, smooth surface of periderm, *i.e.*, outside of bark, production of fruit at dry seasons,

hardiness to live in the open exposed to sun and dry air, where the fungus gets less chance of germinating. The whole question of selection in cacao growing is one of great interest and promise, nothing having been done seriously to breed improved forms, and it is probable that our cacao tree is little, if any, improvement on the native cacao of the Amazon Valley. I purpose to discuss this question, when some experiments I am making have progressed a little further, in a future Circular.

### Summary.

The position of cacao in Ceylon to-day is hopeful, and yet not without cause for some anxiety. The canker is much decreased in quantity since 1898, owing to means having been taken meanwhile to combat it, and the fact that no season specially favourable to the fungus has occurred. But it has been growing in many places, chiefly native holdings, and these diseased places are a menace to the rest of the cacao in the Island. It behoves all owners or managers of cacao property to satisfy themselves, as practical men, by reading this Circular, by personal observations of estates where any treatment has been carried out, and by information from all whose experience and knowledge entitles them to be heard, whether this disease can be lessened by any practicable methods. If they are satisfied as to this point, it is their duty to see that the cacao places which they control shall be treated, and that pressure is brought to bear on all cacao growers to take similar steps.

If a general crusade were carried out in every cacao district in Ceylon for a few years, the canker would be reduced to a minimum, and the cost of guarding against and removing it would in turn be decreased.

I have not been able to get a pronouncement by cacao growers as to their views on the effect of the curative and preventive means used, though some questions bearing on the subject have been sent out by the Cacao Sub-Committee of the Planters Association, and the answers given will no doubt show the opinions of practical men. The following are the rules for treatment of cacao in relation to canker which were previously published in my reports, and having seen them carried out with a large measure of success, it is well to again lay them down:—

*Prevention.*—Regulate the shade so that the sun and air can reach all parts of the cacao trees, and keep the cacao from being so close as by its own leaves to densely shade the ground.

Prevent dampness by surface draining, especially in low hollows.

Allow suckers to grow on all trees that show any sign of disease.

Burn all dead cacao trees and branches.

Burn all discoloured pod husks from whatever cause they are discoloured. (If this is not possible bury with limo.)

Bury all pods under at least two inches of soil with a sprinkling of lime.

*Cure.*—Cut out all diseased patches on bark or branches, removing also a wide margin—not less than two inches—of appparently healthy bark, and burn all the pieces removed.

If this method is too expensive or too drastic, shave lightly over the diseased areas and around them, and burn the shavings. This latter treatment is not so effective as cutting out. Such work should be done vigorously in the dry weather, when the results are vastly better.

Keep a gang of expert coolies continually on the look out for new canker patches, and have these parts removed before they spread far or produce their spores.

Notice any dead cacao trees or branches on neighbouring small holdings, and endeavour to get these moved and burnt.

These sanitary measures should be carried out on all estates, even where the canker is very rare, and the personal oversight of the superintendent seems to be the only way to prevent small patches of disease being missed in going round. It is much better to take a longer time in going round the estate and have the work thoroughly done than to cover large areas and overlook some canker.

The number of trees a cooly can examine and cut in a day depends, of course, on the amount of disease, but it is preferable to spend a day in finishing fifty trees than to run over an acre, and on the next round it will be found that much less work has to be done. On several estates, where the gang consisted of from fifty to a hundred coolies, the number is now reduced to ten to twenty. It must be remembered that the time when the spores grow is during wet weather, and not until some weeks later can the place be detected and cut out. The mistake is common of talking of an "outbreak" of disease, when the evil has arisen, *i.e.*, the spores grown, some time before. The smallness of the acreage of cacao in Ceylon, the chances of success owing to the nature of the disease, and the amount of the profit on healthy cacao in good bearing, make this disease one which should bo reduced or even expelled with exceptional ease. Half measures, and these adopted only on a portion of estates, are sure to be disappointing.

Perhaps I may hope that this Circular will induce many, if not all, to take their part in the crusade against the cacao canker.

J. B. CARRUTHERS,
Government Mycologist and
Assistant Director, Royal Botanic Gardens.

Peradeniya, September 19, 1901.

## CURIOUS BEHAVIOUR OF A FLIGHT OF WAGTAILS.

I send you an extract from a letter received by me the other day from a planter friend at Balur, Mysore, which I think will be of interest to some of your readers.

The wagtails, which is a migratory bird, as every body knows, comes down south with, or just before, snipe, and a flight of them must have been passing over Balur when the rain stopped them,

"A very funny thing occurred here the other night. I was reading in the sitting-room at about 9 p.m., and it was raining heavily outside, when a water wagtail flew into the room, and after a little while I found there were four of them. I did not take much notice of them until one flew on to the lamp and put it out, and then I thought it was high time to go to bed. So I went into my bed-room, and to my surprise found it was full of these birds. They had come in evidently to take shelter from the rain. They seemed quite tame, and several of them sat on my shoulder and on my hands. However, I did not want them flying about my room all night, so I caught them one by one and set them free in the drawing-room. In the morning two were found dead, evidently killed by the dogs, but the rest had all gone!"

C. V. Ryan.

Ootacamund, 12th October, 1901.

—*Indian Forester.*

"Lobelias"—are common enough in and around Nuwara Eliya: can anything be done to utilise them in view of this report in *Chemist and Druggist* of Jan. 4th:—

Lobelia.—Herb is very scarce in New York, 5*d* per lb, c.i.f., being quoted.

## THE TEA ESTATE WITH THE PREMIER YIELD.

### MARIAWATTE'S CROP FOR 1901.

We are obliged to the Superintendent, Mr. D. M. Salmond, for the figures showing the yield of Mariawatte, the premier-yielding tea estate of the island. In the van of all output-restricting properties, —largely perhaps from necessity, as well as to some extent from set purpose—Mariawatte shows a decrease of 265 lb. per acre for 1901 on 1900, and of 16 lb. on 1899, though 1,092 lb. average is above those of 1899 and 1898:—

MARIAWATTE ESTATE.

YIELD OF OLD TEA — 101A. 1R. 0P.

| Year. | | Made Tea lb. | | Yield per acre lb. |
|---|---|---|---|---|
| 1884 | .. | 109,230 | .. | 1,078 |
| 1885 | .. | 117,842 | ... | 1,163 |
| 1886 | .. | 105,925 | .. | 1,046 |
| 1887 | ... | 115,996 | ... | 1,145 |
| 1888 | .. | 106,410 | ... | 1,050 |
| 1889 | .. | 113,834 | .. | 1,124 |
| 1890 | ... | 140,144 | .. | 1,384 |
| 1891 | .. | 120,366 | ... | 1,188 |
| 1892 | ... | 119,909 | ... | 11,84 |
| 1893 | .. | 115,440 | ... | 1,140 |
| 1894 | .. | 110,448 | ... | 1,090 |
| 1895 | .. | 118,560 | .. | 1,170 |
| 1896 | .. | 113,360 | ... | 1,119 |
| 1897 | .. | 105,729 | ... | 1,044 |
| 1898 | ... | 108,423 | .. | 1,073 |
| 1899 | .. | 111,987 | .. | 1,108 |
| 1900 | .. | 137,066 | .. | 1,357 |
| 1901 | ... | 110,302 | ... | 1,092 |

| YIELD FOR THE WHOLE ESTATE. | | 458A. 1R. 17P. lb. | RAINFALL. |
|---|---|---|---|
| 1892 | ... | 643 | 95·74 |
| 1893 | .. | 817 | 86·22 |
| 1894 | ... | 750 | 72·00 |
| 1895 | .. | 886 | 100·28 |
| 1896 | ... | 896 | 115·41 |
| 1897 | .. | 926 | 111·25 |
| 1898 | .. | 738 | 79·90 |
| 1899 | ... | 749 | 106·81 |
| 1900 | .. | 996 | 114·63 |
| 1901 | .. | 792 | 84·38 |

We congratulate the management on the result achieved, satisfactory from the general point of view of tea production everywhere, and also from the particular standpoint of the estate, where a shortage of rainfall of over 20 inches (17 per cent) has been experienced during the past year.

## TEA IN TASMANIA.

The growing of tea for home consumption is, we learn from a Launceston paper, attracting attention in Tasmania. The writer on the subject while fully admitting the hopelessness of producing tea in quantities for competition with China, Japan, India or other places where there is a superabundance of cheap labour, suggests that the plant should be put down as hedges, the clipping of which in the spring, about August and September, would furnish leaf enough to meet household requirements, and perhaps also the wants of the non-agricultural population of the smaller townships.—*Madras Mail*, Jan. 1.



## UP-TO-DATE NOTES FROM SUMATRA.

TYPICAL OF SUMATRA'S EAST COAST.

Dec. 10, 1901.

RACIAL.—The cosmopolitan nature of the population has often been pointed out. Within a two-mile radius of where I am writing are representatives of the following *European nations*:—British, Swiss, Danish, French, Dutch and German; *Asiatics*:—Malay, Javanese, Battak, Chinese, Tamil, Bengalee, Sikh; and sub-divisions of Javanese race, each having a different language, Sundanese, Barneanese, Madurese.

There is a story of a mixed gathering of Europeans, where the Tower of Babel was so nearly approached, that recourse was had to Malay as a *lingua Franca*. Of course, all were united on one point, and that was abuse of England. One, more travelled than the rest, was describing a visit he had paid to what he called 'Kampong London.' Kampong is the Malay word for village! There is one eminent personage that foreigners are never tired of discussing, especially delighting to picture him in an everlasting maelstrom of financial worries. After a very free criticism, so the story goes, one gentleman of liberal tendencies closed the discussion with 'Ya! itu P— of W— tidah dapat chukup blandja!' 'Yes: that P— of W— does not get enough allowance!'

POST OFFICE.—An Englishman, stamping his letters at the P O window with stamps he had just bought, muttered to himself: 'These d—d stamps won't stick.' The clerk, a Dutchman of course, at once politely replied: 'We have a gum-bottle here, Sir!'

RAILWAYS.—There is a narrow-gauge railway connecting Lower Langket with the Deli Spoor-weg Moratschappij which serves the more central part of Deli. Two friends of mine recently missed the 'Sural-spoor' (narrow-gauge) at the terminus. So, bag in hand, they started to run after it, and caught it up at the next station! I wonder if a Bank Manager and a well-known planter will ever emulate this feat on the Kelani Valley line? The following is a good story of the 'Deli Spoor' broad-gauge. The Stationmaster, as usual, saw the train off the platform as it went out. At the next station the passengers were astonished to see the same official on the platform as the train glided in. 'Hullo! what are you doing here?' 'I am in temporary charge here.' 'But we left you behind at the last station! How on earth did you get here?' 'Oh! after you left, I went to the buffet, took a whisky and soda, and came along on my bicycle.'

POVERTY AMONG TOBACCO-PLANTERS!—Some time ago I sent you an account of a stupendous commission said to have been earned by a Head Manager. But there is another side. A most heart rending story was told me the other day about a Head Manager of an apparently successful Tobacco Company who *could not afford to buy a new hat*. The reason why? His commission this year is only 30,000 guilders. Can't you feel pity for a man reduced to such extremities? He cannot afford himself a new hat because his commission is only £2,500! Poor miserable devil! This sort of thing draws a tear of compassion from his neighbour, the coffee-planter, whose very vitals are being eaten out by caterpillars.

W. T. M'K.

## TEA IN THE CAUCASUS.

Our Consul at Batoum, Mr. Stevens, in his last report, has something to say about tea cultivation in the Caucasus, which bears out the views formed by practical people of this budding industry, about which there has been so much optimistic talk. He points out that possibly the climate of Batoum and its environs is all that can be desired for the growth of tea, but there are other local conditions which stand in the way, and accordingly the area under the plant is not increasing as might be anticipated in the case of a promising industry. The two chief tea-growers are the Imperial Domains and Messrs Popoff, and both have added to the area of their gardens, but hardly any other growers of importance exist in the neighbourhood of Batum. The landholders are reluctant to put their land under tea because the results hitherto obtained are so uncertian that they prefer to await further experience. Thus, during the present year, the total crop, which was the largest ever obtained in the Caucasus, was only 13½ tons, although ten years have elapsed since the first experiments were made, and neither money nor pains have been spared by the two pioneer growers to produce tea that will be commercially successful. In the estates of the Imperial Domains the crop was gathered this year from 102 acres, the quality being chiefly that of the Kangra Valley and the system of harvesting being that prevailing in Ceylon. Messrs. Popoff's gardens extend to 312 acres, and the leaf produced is stronger than Chinese, and is gathered on the Chinese system. But, as has been said, the whole industry has not yet emerged from the experimental stage. Last season 117,000 lb. of silkworm eggs were imported from the Caucasus through Batum, about a sixth of which went to Persia and Central Asia; but the Russian papers are clamouring against this trade on the ground that it injures the silkworm rearers of the Caucasus, and makes the industry dependent on foreigners. The silk, except what is used locally, goes for the most part to France. But the industry is not of great commercial importance, nor is cattle-rearing, which is carried on mostly to supply local needs.—*H. and C. Mail*, Dec. 20.

## A LONDON OPINION ON THE INCREASED TEA CESS.

### THE CHANGE NOT APPROVED.

We learn that the following reply has been forwarded to the Secretary of the Ceylon Association in London in answer to his letter sent with that of Mr. Rosling's asking for votes relative to the increase of the Tea Cess:—

17th Dec., 1901.

The Secretary, Ceylon Association in London, 62, Gracechurch Street, E.C.

DEAR SIR,—We are in receipt of your circular of 13th inst., relative to the Ceylon Tea Cess, and we have to say in reply that we are not prepared to agree to the proposed increase, but on the other hand, are willing to join in any movement to abolish the existing Cess.

We consider that no adequate result has, from the beginning, come from the work and expenditure of the Commissioners in America and in Europe, and that the existing channels of distribution in the tea trade are amply sufficient to dispose of all the production. The appointment of Commissioners who are inexperienced in the regular business of tea distribution, merely gives offence to regular traders, and the unfairness with which grants are made tends to retard, rather than to advance, the efforts to extend the use of Ceylon tea.

We think that, in all probability, the consumption of black teas of Ceylon production would have been as large in the United States and Canada today, had your Commissioner never been sent there. In any case, we do do not attribute to his efforts the development in demand. The constant lowering in prices of Ceylon tea has displaced China tea in most of the markets of the world, until there is comparatively little trade left in black China teas to be displaced.

We point out to you, as significant proof of our argument that Special Commissioners do little good, the fact, that for very many years no special efforts have been made by Ceylon producers in Australia, and none at all, until recently, in Russia, and yet those two countries show very large increases in the volume of consumption, the reason being that the extreme lowness of price for Ceylon tea has rendered it impossible that China tea could be shipped in competition. Progress of the same character has been observable in Great Britain. The place where the greatest effort has been made, has shown the least return, viz: the American Continent, the reason being that there was a comparatively limited black tea market to be changed from China to Indian or Ceylon teas.

The business of tea distribution throughout the world is one that is carried on under very keen competition, and tea merchants are so thoroughly alive to their own interests that they have been most willing, wherever possible, to substitute a better for an inferior tea, and consequently black China tea has given way before Indian and Ceylon, the process of substitution having been greatly accelerated of recent years by the fall in the value of the latter.

Some credit is due to your American Commissioner for the suggestion that part of the Ceylon growth should be made into green tea, and if your Association were to direct their efforts to the production of green teas of such a character and at such prices that they would compete with Japan green tea, some good might result.

We have just had furnished to us, through a private channel, the official figures of the Canadian Government for the last completed trade year of tea importation, which go to bear out the opinions we have expressed. They are as follows:—

| | Black Teas, | Green Teas |
|---|---|---|
| China ... | 3.629,286 lbs. | 862,379 lbs. |
| Japan ... | 831,307 ,, | 6,619,296 ,, |
| Ceylon ... | 6,250,963 ,, | 335,815 ,, |
| Indian ... | 3,996,544 ,, | 81,578 ,, |

It will be shown that there is ample room for displacement of green tea in consumption.

It would lessen the objections to the Cess, were all distributions from it made to the producers or shippers in Ceylon on a publicly announced basis, and not to the ultimate distributors in secrecy, at the discretion of one individual.—We are, dear sir, yours faithfully,

McMEEKIN & CO.

## CEYLON TEA ON THE EUROPEAN CONTINENT.

On the rule of *audi alteram partem* it is well to see what a gentleman of Mr. Marcel's continental experience and interest in Ceylon has to say on Mr. Renton's work in trying to extend the demand for our tea. And in the letter which we print elsewhere today, Mr. Marcel makes not a few observations which are both pointed and pungent, and which may be useful in reference to the future guidance and action of the "Ceylon Tea Commissioner." But we are certainly not prepared to go with our correspondent in his general condemnation of the Continental Tea Campaign. No doubt France is one of the most difficult of European countries in which to gain much support for our tea; but there should be far less difficulty in Germany and still less in Russia, where tea is already so well-known and popular. By-the-way, cannot Mr. Marcel show us how the fact that Russia—the special ally of France—is a great consumer of tea, could be utilised to win over the French people to this average. If he would do so, Ceylon planters would, indeed, reckon our correspondent among their benefactors. But in the letter before us, there is too much of criticism and censure, and too little of alternative suggestion. If Mr. Renton is going the wrong way to work, in his "degustation" system, what would our correspondent propose as a substitute? No doubt, if the notables—and especially the ladies—in each town could be gathered together to a "five-o'clock tea," and a suitable discourse on the virtues of Ceylon tea, the immediate result should be more satisfactory. But we must not despise the masses—the *hoi polloi*—nor the benefit of inculcating a taste for Ceylon tea by a free distribution in the cup; for in our experience from successive visits to Vichy and other parts of France, "tea" was regarded as a medicine and until within a few years back we were generally referred to the pharmacist when we wanted to purchase any of the fragrant leaf. That being the case, if Mr. Renton can only help to get the French people, even of the lower classes, to see from their own experience, that Ceylon tea is really a pleasant and refreshing beverage, the money voted should be well spent. But if Mr. Marcel will only suggest a more excellent way of going to work, we can promise the fullest consideration. As to the Continental Campaign generally, there ought certainly to be no slackening in the support of Mr. Renton, so long as his engagement lasts. When that comes to an end, it may be necessary to reconsider the whole position of the necessity for a Cess and its expenditure in the light of what mercantile firms in the tea trade, experts with Continental and American experience, have to tell us, and we certainly count Mr. Marcel among the number. For ourselves, we should be inclined to close the American campaign—it has lasted a good many years—save, so far, as the payment of a bonus on "green teas" at this end is concerned, and to continue the Continental Campaign for some years longer, with such modifications in the working as experts may recommend.

## INDIAN TEA AND OTHER TRADE WITH KASHGAR.

Mr. George Macartney, Special Assistant for Chinese Affairs at Kashgar, gives a rather gloomy account of the trade between India and Chinese Turkestan. One of the causes of the depression is an enhanced duty on charas, and some difficulty is caused by the exchange question in converting tengas into rupees and *vice versa*. With a view to improving the trade Mr Macartney suggests a system of bounties on Indian exports, the development of the tea trade and the mule traffic and the importation of Kashmir opium. With regard to the tea trade no care is shown by the British traders in considering the requirements of the market, for which Kangra Valley tea in its present form is unsuited. A tea similar in taste and shape to the brick tea from China is required, but care will have to be shown in avoiding collision with the Chinese traders from Hunan. The mule traffic from Turkestan to India is also of special importance as the Commissariat and Ordnance Departments have great need of a regular supply of these animals. Mr Macartney says that a fair number could be obtained annually at Yarkand if it became known in the outlying districts that we would purchase them.—London *Times*, Dec. 18.

## MANGABA: OR MANGABEIRA RUBBER.

On the Pará side of the Tocantins and Araguaya rivers, between the Itacayuna and the Tapirepe, there is in the *campos* (land covered with lower vegetation) a shrub, the "magabeira," which gives a milk more or less similar to that of the Pararubber tree, but which does not coagulate so easily and not at all through the smoking process. The mangabeira is never to be found in the forest; it is only in the *campos*, where the vegetation is not high. It is about 7 or 8 inches in diameter; the average height is 16 feet; it is not very resistant and perishes quickly when overworked. It gives quite enough milk, yet as the stuff has at present no great commercial value, this advantage disappears. Among the Rio do Somno, which is one of the places of production, 33 pounds are sold at less than 20 milreis [=equal $4.40, gold, with exchange at 11*d.* per milreis] and in the town of Para itself the value is seldom double. As the milk is abundant, the production is equally so. A man gets easily 11 pounds per day, but as the price is low, this industry is not so advantageous for the working man. Something like 5 milreis per day is not very much in such a place where a man has to

provide his own food. Yet in spite of that, in spite of the great distance to the nearest market towns, and in spite of the uncertainty of the sale, there are already some working people coming from the state of Maranhao and from Bahia. The total production is less than 22,000 pounds (in weight). EUGENE ACKERMANN, Engineer.

Para Brazil, Oct. 23, 1901.

—*India Rubber World*, Dec. 1st.

## ZULULAND MICA: COMPANY FORMED.

A company has been formed in Durban with a capital of £10,000, for the purpose of purchasing and working mica mines in Zululand. Samples of the mica have been sent to England, and replies have been received that the sample is worth £560 per ton. The whole of the capital has been subscribed locally. The directors proceed to Zululand this week to inspect the property.—*Natal Mercury*, Dec. 10.

## THE PRODUCTS OF STRAITS SETTLEMENT AND MALAY PENINSULA.

Mr. H N Ridley, Director of the Botanic Gardens, Singapore, delivered a lecture at the Imperial Institute on Monday entitled "The Economic Resources of the Straits Settlements and the Malay Peninsula." He remarked that the forests, which orginally covered the whole peninsula, contain many valuable products, such as timbers, wood-oil, benzoin, gutta-percha and rattans. Owing to the felling of trees by the Malays, gutta-percha, so indispensable for electric work, has been nearly exterminated. Fortunately, however, the product can now be extracted from the leaves and twigs without injury to the trees, which are being planted by the Government. A very large area of the Federated States is under coffee, but on account of the present glut of the market and the consequent low prices, most of the planters are adding Para-rubber to their estates—a tree which thrives marvellously well and produces a very satisfactory amount of rubber of the first quality. India-rubber from the *Ficus elastica* also promises well, but although it is being planted, its product is less highly valued. Accounts were given of the cultivation and preparation of sago—one acre of the sago palm gives as much nourishment as 163 acres of wheat—tapioca, gambir, mangrove-cutch, pepper, nutmegs, cloves, indigo and pineapples. The greater part of the preserved pines of commerce come from Singapore, where the price of the fruit varies from a farthing to a penny each, and the lecturer remembered a time when they had been as cheap as sixteen a penny. The mineral resources of the colony include gold and tin, the latter being found in great abundance.—*Nature*, Dec. 19.

## "PARA RUBBER" IN THE STRAITS SETTLEMENT.

[To the Editor of the *India Rubber World*.]

A few weeks ago I posted you a copy of the annual report of the botanic gardons in this colony, containing, among other rubber notes, the result obtained by tapping a single Para rubber tree (*Hevea Brasiliensis*) growing in the Waterfall botanic garden, Penang. The result of four tappings within two years, as shown in that report, is 12½ pounds of dry, marketable rubber. Within the past month the same tree has been again tapped, and yielded over 2 pounds more, so that this one tree has given 14½ pounds, without being excessively tapped. How long it will continue to yield at this rate is a matter of conjecture, but so far as can at present be seen there has been no apparent injury to the tree. I am sending you by post a sample of the rubber and shall esteem it a favor if you will kindly submit it to some expert engaged in the manufacture of rubber goods for an opinion as to its quality and value.

In a few years' time this will be a large article of export from this region, and also what is known here as "gutta rambong" (*Ficus elastica*). Many large plantations here and in the adjoining Federated Malay States were commenced about four years ago and tapping on a large scale is anticipated by the time the trees are eight years old. New plantations are being formed as fast as seeds are obtainable, but the supply is not equal to the demand. The tree from which the rubber I am sending you was taken is sixteen years old but in good soil such as most of the planters are using the trees will be quite as large in eight or ten years. Ours is growing on a dry gravelly bank conditions quite the opposite or those under which it naturally grows so far as one can judge from the reports of those who have seen it growing in Brazil. Here it will grow anywhere, though of course not equally well in all places and there is no doubt that in the future this country will have to be reckoned with as regards rubber. As a field for investment in this particular cultivation it would be hard to beat. Land is abundant and cheap and roads, railways and rivers afford easy access to all parts of the Malay peninsula. C. CURTIS, F.L.S

Superintendent of Forests Section Botanic Gardens.

Penang Straits Settlements, September 24, 1901.

COMMENT BY THE EDITOR.—The tree from which was obtained the sample of rubber referred to above was stated in the annual report of the botanic gardens for 1900 to be 55 feet high, with a circumference at 3 feet from the ground of 66 inches. The record of yield of this tree as stated in the annual reports is as follows, the tree having been tapped for 14 alternate days in each of the seasons mentioned :

| | | Lbs. | Oz |
|---|---|---|---|
| November-December, 1898 | .. | 3 | 0 |
| April-May, 1899 | ... | 2 | 8 |
| November-December, 1899 | ... | 3 | 4 |
| October-November 1900 | ... | 3 | 12 |
| August-September 1901 | ... | 2 | 0 |
| | Total .. | 14 | 8 |

From the same reports it is to be inferred that the rubber produced has been smoked with coconut husk after first having been allowed to coagulate and then rolled into thin sheets. Where the rubber milk has happened to contain rain water, alum or spirits of wine has been used to hasten coagulation. The method of coagulating rubber on the Amazon is by submitting the fresh *latex* to the hot smoke of palm nuts quite a different method from that employed by our Penang correspondent. The Penang rubber has been examined quite carefully, and is worth about 60 cents a pound, with fine Para at 80 cents a pound. In fact it does not resemble fine Para very strongly, but is much more like Pernambuco. The rubber is much softer than fine Para, or even than coarse Para, and has nowhere near as strong fibre. In fact, it is quite short. It could not be used, for example, in thread, elastic bands, or any fine pure gum goods. In solution it loses its tenacity very quickly, so that it would not do for high grade cements. Another thing about it is that it softens with age, whereas the Para rubbers grow hard and oxidize. We think the reasons for these differences are two: one being found in the manner of coagulation, which does not seem equal to the smoking process; and the other being due to the undoubted change wrought upon the tree by a different climate from that in which the tree naturally flourishes. It is to be understood, of course, that the rubber is valuable, as

will find a ready market at a good price, but it is not the equal of either fine or coarse Para. We think this is another proof that rubber will be cultivated most successfully in the regions where it grows wild.

KAMERUN (GERMAN WEST AFRICA).

The Moliwe Pflanzungs Gesellschaft, of Hamburg, (Germany, at the end of their second business year of July 1st 1900 – June 30, 1901), reported that 42 acres of their estate at Moliwe in this colony had been planted in rubber, 32½ acres being devoted to *Kickxia elastica*, the tree which yields the Lagos rubber. The number of trees was 3,960 which gave 300 to the hectare, or 121 to the acre. Dr. Paul Preuss, director of the botanical gardens at Victoria (Kamerun), writing to the editor of *Der Tropenpflanzer*, makes an unfavorable report on the growth of these plants, while the *Castilloa elastica* has done well. The late Herr Stammler, head planter of the Moliwe company, reported favorably on the *Castilloa elastica*, and the company, on the advice of Dr. Otto Warburg, of Berlin, and with the aid of Herr Th. F Koschny, of San Carlos Costa Rica, obtained from the latter country this year 400,000 seeds of the *Castilloa*. Although the larger part of these seeds, by reason of the long voyage, were found to be spoiled on reaching Hamburg, it was hoped that at least 100,000 *Castilloa* plants could be grown for Kamerun from the lot. The Moliwe company are experimenting with various other rubber species.=Of the rubber under cultivation in the gardens at Victoria, Director Preuss reports that the seedlings of *Kickxia elastica*, from seeds planted in November, 1898, had, in two years and a half, reached a height of 3 meters, and were flowering. Besides, the bark was found to contain *latex*. The *Ficus Vogelii*, another African tree under cultivation, yields rubber liberally and of good quality. *Sapium utile* and *Hevea Brasiliensis* (Para rubber) are each represented in the gardens by a few good specimens, the young trees of the latter species having begun to bear seeds. —*India Rubber World*, Dec. 1.

## PLANTING.

### ILLUSTRATED LECTURES AT THE IMPERIAL INSTITUTE.

(*From a correspondent.*)

In case you have not received particulars of the last two lectures at the Imperial Institute, I am sending you a few notes herewith :—

On December 2nd a lecture entitled

PLANTERS AND PLANTING IN TROPICAL GREATER BRITAIN

was given by Mr R Hedger Wallace, Sir Edward Noel Walker being in the chair. The gist of the lecture, which could not be said to have done justice to the subject, was (1) the definition of a Planter, and (2) the necessary qualifications of a Planter. The duties of a planter, said the lecturer, vary in different colonies, as, for example, in Tropical Africa he has to teach the natives how to work, whilst in India he has only to see that the work is done by them in accordance with certain methods. The best planters were obtained from the middle classes, and men who have not had a sound education were generally failures as planters. Young men intending to try planting, in India especially, should have a good training in agriculture and book-keeping, and also have a knowledge of engineering and domestic medicines. He should also be naturally of a sociable character in order to meet certain social demands on his time. The first (and best) of the lantern slides shown was a group of coconut palms on the sea-coast in Ceylon, yet Ceylon was not referred to in the lecture; but, perhaps, India was meant to include the little island.

Last Monday evening, the 16th instant, Mr. Ridley, Director of Botanic Gardens, Singapore, gave an interesting lecture on

"THE ECONOMIC RESOURCES OF THE STRAITS SETTLEMENTS AND MALAY PENINSULA,"

the chair being taken by Sir Cecil Clementi Smith, formerly Governor of the Straits Settlements.

Being favoured with a precis of the lecture I send it to you, adding slightly to it :

Probably, said Mr. Ridley, no portion of the Empire was so little known to the English public as that of the Straits Settlements and the attached Federated States. It was, however, one of the most thriving of the smaller colonies, and possessed, in Singapore, the most important port in Eastern Asia. Its heavy rainfall, of over 100 inches annually, was evenly distributed throughout the year; so, unlike other tropical regions, there were no seasons. The trees, which were evergreen and for the most part bore flowers and fruits irregularly all the year round, grew with great rapidity; consequently it had been found more suitable to cultivate plants whose produce was derived from the vegetative portion rather than from the fructificative. The climate though hot was neither unpleasant nor unhealthy, and cases of sun-stroke were almost unknown, coolie labour on the estates was supplied by Javanese and Tamils; the Chinese, though very industrious and invaluable when working for themselves in agriculture, commerce, or mining, had not been found amenable to European methods and discipline. The forests, which originally covered the whole peninsula, contained many valuable products, such as timbers, wood-oil, benzoin, guttapercha, and rattans. Owing to the felling of the trees by the Malays, in order to extract it, guttapercha, so indispensable for electric work, had been nearly exterminated Fortunately, however, the product could now be extracted from the leaves and twigs without injury to the trees, which were now being planted by the Government. A very large area of the Federated States was under coffee, but on account of the present glut of the market and the consequent low prices, most of the planters were adding para-rubber to their estates—a tree which throve marvellously well and produced a very satisfactory amount of rubber of the first quality. In the Straits this tree grows to a height of 30 feet in five years, giving a yield of rubber at this age; even a tree three years old has given a yield of 3 lb. of marketable rubber. This I am afraid puts Ceylon entirely in the shade, unless new data are forthcoming. India-rubber from the ficus elastica also promised well, but, although it was being planted, its product was less highly valued. The coconuts grown in the colony were in large demand, both for copra and as food. The adage that the

coconut palm would only grow within sight of the sea was more or less true, as the palm would only grow for about 20 miles inland in the Straits. This is, however, quite disproved in Ceylon. Accounts were griven of the cultivatiou and preparation of sago—one acre of the sago palm gave as much nourishment as 163 acres of wheat, (one palm stem giving 600 to 700 lb. of sago) tapioca gambir, mangrove-cutch, pepper, nutmegs, cloves, indigo and pineapples. The greater part of the preserved pines of commerce came from Singapore where the price of the fruit was said to vary from a farthing to a penny each, and the lecturer remembered, a time when they had been as cheap as sixteen a penny. The mineral resources of the colony included gold and tin, the latter being found in great abundance. It was chiefly alluvial, and the mines, which were shallow, were worked by the Chinese who employed very simple appliances. The country was as yet hardly properly explored, and Mr. Ridley was of opinion that immense fields for development yet remained open; that both agriculture and mining were still in their infancy; and that thriving as the colony now was, it had before it a future of greater and long continued prosperity.

## PROPOSED PURCHASE OF TEA ESTATES.

BY THE WHOLESALE CO-OPERATIVE SOCIETY.

Tea garden proprietors may be interested to learn that at the quarterly meeting of the Co-operative Wholesale Society, held in Manchester on Saturday afternoon, representing 300 shareholding societies, an agenda to the report included a request from the committee for authority to purchase tea estates when a suitable opportunity occurs. For some time past this question has been under consideration and a few years ago a deputation was sent out to make full inquiries into the feasibility of the society working such estates. Since then there has been a continual expansion in the tea trade of the society, and the committee are of opinion that the time is now ripe to make an initial move in the direction of co-operators becoming their own tea growers. After some discussion, the request was unanimously acceded to. So that "when a suitable opportunity occurs" the society will possess its own tea gardens.—*H. and C. Mail,* Dec. 27.

## TROUT AT OOTACAMUND.

Major Bagnall concludes his last Report on trout thus:—

"I have fished, I think everywhere where a trout would lie but have nothing to report. All this evidence goes to prove that trout have not bred on these hills." Yet an experienced angler tells me that he has more than once seen trout rise in the "St. Lawrence" lake, and on one occasion, not long ago, found one dead on the banks of the lake which scaled between 5 and 6 pounds. The attempt made by the District Forest Officer to drag the lake, in the opinion of this sportsman, proved a failure for the reason that this officer used a net quite unsuited for a water of the depth of the St Lawrence Lake, and suggests the using of a net 100 feet by 30 feet, which he thinks, can be easily made up of discarded tennis nets. Carp and tench are affording really grand sport, especially the former at Sandy Dulla, where the golden fish of quite the size of the Madras pomfret can be plentifully had. These fish must have escaped from the Ootacamund lake when that body of water was lowered, and in fact almost drained, while the reclamation of the upper lake was in course of progress, and appear to have become very plentiful within the last two years.—*Asian* (Ootacamund Cor.)

## COCONUT PLANTING NOTES, N-W. PROVINCE.

### THE WEATHER.

Marawila, Jan. 8th.

The New Year dawned auspiciously for us with seasonable, *i.e.* wet weather. We have not had much rain so far, only slow, persistent drizzles, but the indications of rain and the non disappearance of the rains of the N.-E. monsoon, are much to be thankful for. Most of the rain that fell during the last three months was from the S.-W. It was only in December that we had a little rain from the N.-E.

### COCONUT PLANTING.

The last crop of the year has been a bit better than the previous one, but this has not been of much help to the desiccating mills in this district for it pays sellers better, it seems, to convert nuts into copra, than to sell to the mills. This is the first time, I believe, in the history of the mills in this district, that they had not sufficient nuts to keep them constantly going. A record price for coconuts in the heap—R50 12 per 1,000—was lately announced from the Negombo district. With what truth I cannot say, but it was stated that the rice paid was due to rivalry between bidders. In this district the nuts of an estate were put up to auction and fetched R50·50 per thousand for making copra. Considering that the cost of transport of nuts is R2 per thousand more from this district than from Negombo, the price realised must be considered eminently satisfactory by the lucky, youthful proprietors.

## PLANTING NOTES.

POISONS IN INDIA AND CEYLON.—In the course of an exhaustive review of the Pharmacy and the Drug-trade in 1901 the *Chemist and Druggest* says:—"India and Ceylon are practically without pharmaceutical organisation, although their trade interests, so far as medicine purchasing power is concerned, are great. The sale of poisons has been centralled in Ceylon during the year by a new Ordinance, which, however, does not call for special fitness in the sellers. Several suggestions have been made for better controlling the sale of poisons in India. The subject deserves the serious attention of the Governments, but is attended with greater difficulties than can be imagined by people at home."

## TEA SALES.

### PUBLIC SALES OF TEA IN COLOMBO.

DURING THE YEAR 1901.

| | | Offered | Sold | Avg. 1901. | Avg. 1900. | Exchange. Demand Drafts. 1901. |
|---|---|---|---|---|---|---|
| | | lb. | lb. | c. | c. | s. d. |
| Jan. | 4 | 1,391,965 | 1,153,308 | 27 | — | 1 4 3-32 |
| " | 9 | 5 53,904 | 431,976 | 31 | 35 | 1 4 1-16 |
| " | 16 | 1,273,906 | 940,636 | 29 | 36 | 1 4 3-32 |
| " | 23 | 1,118,132 | 802,961 | 27 | 34 | 1 4 1-32 |
| " | 30 | 54,344 | 674,852 | 27 | 34 | 1 4 |
| Feb. | 6 | 742,780 | 420,277 | 30 | 35 | 1 4 |
| " | 13 | 829,688 | 687,341 | 29 | 34 | 1 4 |
| " | 20 | 994,218 | 754,870 | 29 | 35 | 1 4 |
| " | 27 | 764,678 | 631,670 | 30 | 34 | 1 3 15-16 |
| Mar. | 6 | 809,695 | 702,382 | 34 | 32 | 1 3 15-16 |
| " | 13 | 875,618 | 695,405 | 35 | 34 | 1 3 15-16 |
| " | 20 | 1,174,658 | 951,106 | 36 | 35 | 1 3 15-16 |
| " | 27 | 1,048.156 | 797,593 | 37 | 35 | 1 3 15-16 |
| April. | 2 | 1,252,155 | 850,467 | 39 | 36 | 1 3 15-16 |
| " | 9 | | — | — | — | — |
| " | 17 | 1,497,279 | 1 057,595 | 35 | — | 1 3 15-16 |
| " | 24 | 1,241.071 | 815,052 | 33 | 35 | 1 3 15ɪ-6 |
| May | 1 | 1,112,955 | 727,960 | 31 | 36 | 1 4— |
| " | 8 | 960,695 | 642,959 | 32 | 35 | 1 3 15-32 |
| " | 15 | 1,143,261 | 679,827 | 30 | 35 | 1 3 15-32 |
| " | 22 | 1,131,672 | 781,925 | 29 | 31 | 1 3 15-16 |
| " | 29 | 1,117,318 | 840,768 | 27 | 31 | 1 3 15-16 |
| June | 5 | 1,102,082 | 965,105 | 31 | 30 | 1 3 15-16 |
| " | 12 | 1,121,802 | 995,806 | 32 | 32 | 1 3 15-1 6 |
| " | 19 | 1,225,228 | 976,359 | 32 | 32 | 1 3 15-1 6 |
| " | 26 | 1,182,810 | 934,671 | 31 | 30 | 1 3 15 -16 |
| July. | 3 | ,178,429 | 918,636 | 29 | 31 | 1 3 1g-16 |
| " | 10 | 1'837,284 | 703,892 | 32 | 34 | 1 3 15-16 |
| " | 17 | 231,803 | 1,054,552 | 30 | 33 | 1 3 15.16 |
| " | 24 | 1,040,760 | 945,463 | 32 | 36 | 1 3 15-16 |
| " | 31 | 1,901,932 | 685,264 | 32 | 37 | 1 3 15-16 |
| Aug. | 7 | 907,145 | 763,015 | 33 | 35 | 1 3 15-16 |
| " | 15 | | — | — | — | — |
| " | 21 | — | 1,376,780 | 35 | 35 | 14 |
| " | 28 | 1,549.177 | 745,250 | 35 | 37 | 14 |
| Se,pt. | 4 | 897,728 | 667,251 | 37 | 36 | 1 4 |
| " | 11 | 849,417 | 609,829 | 35 | 37 | 1 4 |
| " | 18 | 760,181 | 788,485 | 36 | 40 | 1 4 |
| " | 25 | 1,089,937 | 843,266 | 38 | 40 | 1-4 |
| Oc,t. | 2 | 1,097,090 | 698,685 | 37 | 36 | 1 4 |
| " | 9 | 959,213 | 640,449 | 38 | 37 | 1 4 |
| " | 16 | 888,722 | 778,145 | 36 | 37 | 1 4 |
| " | 23 | 1,023,926 | 923,050 | 37 | 35 | 1 4 |
| " | 30 | 1,113,115 | 814,762 | 37 | 33 | 1 4 |
| Nov. | 6 | 996,820 | 732,314 | 38 | 33 | 1 4 1-32 |
| " | 13 | 906,430 | 600,396 | 37 | 34 | 1 4 1-32 |
| " | 20 | 771,709 | 815,049 | 37 | 31 | 1 4 |
| " | 27 | 1,017,906 | 643,350 | 36 | 29 | 1 4 |
| Dec. | 4 | 892,626 | 705,333 | 36 | 29 | 1 4 |
| | 11 | 974,680 | 552,075 | 34 | 28 | 1 3 31-32 |
| | 18 | 920,371 | 1,282,761 | 33 | 28 | 1 3 31-32 |
| | | 1,617,326 | | | | 1 3,31-32 |
| Total for=1901 | | 51,044,000 | 39,154,923 | 33½ | 34½ | 1/4 |
| Do, 1900 | | 47,681,826 | 38,442,926 | — | — | 1/4 1-16 |

### PUBLIC SALES OF TEA IN LONDON.

DURING THE YEAR 1901.

| | | Packages Offered. | Packages Sold. | Reuter's Average. 1901 | Gow, Wilsons, and Stanton's Average. 1901. | 1900 |
|---|---|---|---|---|---|---|
| Jan. | 3 | 22,000 | 20,000 | 7 | 7 1/8 | 7 3/4 |
| " | 10 | 29,000 | 27,000 | 6 5/8 | 6 1/2 | 8 |
| , | 17 | 30,000 | 28,000 | 6 1/2 | 6 1/2 | 7 3/4 |
| " | 24 | 28,000 | 26,000 | 7 1/2 | 7 | 7 1/2 |
| " | 31 | 40,000 | 37,000 | 6 1/4 | 6 3/8 | 7 1/4 |
| Feb. | 7 | 28,000 | 23,000 | 6 | 6 1/4 | 7 1/2 1/2 |
| " | 14 | 32,000 | 21,000 | 6 | 6 | 7 5/8 |
| " | 21 | 21,000 | 20,000 | 6 3/8 | 6 3/8 | 7 1/2 |
| " | 28 | 30,000 | 28,000 | 6 1/2 | 6 3/8 | 7 5/8 |
| Mar. | 7 | 35,000 | 33,000 | 6 5/8 | 6 1/2 | 7 5/8 |
| " | 14 | 29,000 | 27,000 | 6 1/2 | 6 1/2 | 7 3/8 |
| " | 21 | 26,000 | 24,000 | 6 3/4 | 6 5/8 | 7 1/2 |
| " | 28 | 25,000 | 24,000 | 7 | 7 1/8 | 7 |
| Apr. | 4 | — | — | — | — | — |
| " | 11 | — | — | — | — | — |
| " | 18 | 32,000 | 30,000 | 7 3/8 | 7 1/4 | 7 5/8 |
| " | 25 | 33.000 | 28,000 | 7 | 6 7/8 | 7 3/8 |
| May | 2 | 26,000 | 20,000 | 6 5/8 | 6 5/8 | 7 1/8 |
| " | 9 | 20,000 | 17,000 | 6 1/2 | 6 1/2 | 8 1/8 |
| " | 16 | 20,000 | 18,000 | 6 3/8 | 6 3/8 | 7 1/8 |
| " | 23 | 25,000 | 22,000 | 6 5/8 | 6 5/8 | 7 |
| " | 30 | — | — | — | — | — |
| June. | 6 | 28,000 | 26,000 | 6 1/2 | 6 1/2 | 6 3/4 |
| " | 13 | 32,000 | 32,000 | 6 1/2 | 6 1/2 | 6 3/4 |
| " | 20 | 30,000 | 28,000 | 6 3/8 | 6 3/8 | 6 1/2 |
| " | 27 | 25,000 | 24,000 | 6 1/4 | 6 1/4 | 6 5/8 |
| July. | 4 | 33,000 | 19,000 | — | 6 1/4 | 6 5/8 |
| | 11 | 16,000 | 15,000 | 6 1/2 | 6 1/2 | 6 7/8 |
| " | 18 | 32,000 | 23,000 | 6 1/2 | 6 1/4 | 7 1/8 |
| " | 25 | 32,000 | 24,000 | 6 1/2 | 6 1/2 | 7 1/4 |
| Aug. | 1 | 30,000 | 22,000 | 6 1/2 | 6 1/2 | 7 1/4 |
| " | 8 | — | — | — | — | — |
| " | 15 | 31,000 | 28,000 | 6 5/8 | 6 5/8 | 7 |
| " | 22 | 28,000 | 26,000 | 6 3/4 | 6 3/4 | 6 7/8 |
| " | 29 | 26,000 | 25,000 | 6 7/8 | 6 7/8 | 6 7/8 |
| Sept. | 5 | 25,000 | 23,000 | 7 | 6 7/8 | 6 7/8 |
| " | 12 | 23,000 | 22,000 | 7 1/4 | 7 1/4 | 6 3/4 |
| .. | 19 | 21,000 | 20,000 | 7 1/2 | 7 1/2 | 6 7/8 |
| " | 26 | 20,000 | 19,000 | 7 7/8 | 7 7/8 | 7 |
| Oct. | 3 | 19,000 | 18 000 | 8 | 8 | 8 1/4 |
| " | 10 | 21,000 | 19,000 | 7 3/4 | 7 3/4 | 8 |
| " | 17 | 16,000 | 14,000 | 7 3/4 | 7 3/4 | 7 7/8 |
| " | 25 | 20,000 | 18,000 | 8 | 8 | 8 |
| " | 31 | 17,000 | 15,000 | 8 1/4 | 8 1/8 | 8 3/8 |
| No v | 7 | 13,000 | 10,000 | 7 7/8 | 7 7/8 | 8 1/4 |
| " | 14 | 19,000 | 18,000 | 7 3/4 | 7 3/4 | 7 7/8 |
| " | 21 | 20 000 | 17,000 | 7 5/8 | 7 5/8 | 7 5/8 |
| " | 28 | 17'000 | 15,000 | 7 7/8 | 7 3/4 | 7 5/8 |
| Dec. | 6 | 30'000 | 26,000 | 7 1/2 | 7 1/2 | 7 3/4 |
| " | 13 | 22,000 | 19,000 | 7 1/2 | 7 1/2 | 7 7/8 |
| " | 19 | 20,000 | 19,000 | 7 1/2 | 7 1/2 | 7 7/8 |
| Total for=1901 | | 1,197,000 | 1,057,000 | 7 | 7 | 7 1/4 |
| Do. 1900 | | 1,295,000 | 1,179,000 | 7 1/4 | — | — |

[The figures for local sales are compiled from the weekly circular of Messrs. Forbes & Walker, while those for London sales are from • telegrams received weekly.]

SWEET SMELLING PLANTS,—such as woodruffe—were recommended for medical purposes by Linæus, in his *Philosophia Botanica*, where it is stated that such plants not only drive away moths and other destructive vermin, but also, "when chewed, preserve people from infectious disorders." In recent years Dr. Klein, the well-known bacteriologist, has pointed out that some plants, owing to their strong odours, have a certain amount of antiseptic power. The experiments of Omeltschenko have confirmed the view that the vapours of essential oils exercise a bactericidal action. The bacillus of typhus has been killed in forty-five minutes by air containing the vapour from oil of cinnamon or oil of valerian. Similarly, the bacillus of tuberculosis was destroyed in twenty-three hours by oil of cinnamon, and in twelve hours by oil of lavender or oil of eucalyptus. Essential oils have been classified by Omeltschenko, according to their bactericidal power, as follows :—Cinnamon, fennel, lavender, cloves, thyme, mint, anise, eucalyptus, turpentine, lemon, and rose, the last two being very weak, as compared with the others. The work done in this direction requires confirmation, but the results so far obtained go far to prove that there was something in the notions which prevailed long ago with regard to the preventive and remedial powers of odorous plants and their products.—*Journal of the Jamaica Agricultural Society.*

## PLANTING NOTES.

Rubber Production of the Congo River Country.—The output of India-rubber this year from the Congo Free State alone (says the *India Rubber World*) can hardly fail to reach 12,000,000 pounds, besides which portions of French Congo and other regions adjacent to the Congo river help to swell the rubber shipments by that great water-way. It is one of the wonders of the crude rubber trade, how rapidly it has been developed in this particular state, and how well the production has been maintained. The explorer Stanley proved to be right when eleven years ago, on emerging from a journey across central Africa, he described the Congo forests as a "reservoir of rubber." Already some rubber had been marketed from the Congo Free State; some of it, indeed, had appeared the year before—in 1889—at Antwerp, thus affording a beginning to what has become one of the world's great rubber markets. But the world had yet to learn how vast were the rubber resources of "the dark continent." While other sources of African rubber supplies—as Sierra Leone, Gold Coast Colony, Lagos, Angola, Mozambique, and Madagascar—have had their "boom" followed by a decline in production, rubber from the Congo continues to come, in an ever-swelling volume. The following table denotes the total quantity of the rubber arrivals at Antwerp, in each year, and also (in parenthesis) the amount of rubber other than Congo sorts during the past six years:—

| Years. | | Pounds. | Years. | | | Pounds. |
|---|---|---|---|---|---|---|
| 1889 | ... | 10.340 | 1896 | ... | (20,900) | 2,454,925 |
| 1890 | ... | 66,000 | 1897 | ... | (266,844) | 3,694,139 |
| 1891 | ... | 46,200 | 1898 | ... | (616,629) | 4,432,100 |
| 1892 | ... | 138,523 | 1899 | ... | (903,025) | 7,486,336 |
| 1893 | ... | 367,831 | 1900 | ... | (1,751,270) | 12,535,677 |
| 1894 | ... | 600,076 | 1901 | ... | (Partly estimated) | |
| 1895 | ... | 1,168,363 | | | (1,020,956) | 13,096,409 |

[Arrivals for 1901 reported only to October 31.]

Waste Products.—Perhaps among the most remarkable discoveries of the past half-century, has been the utilisation of substances which had been thrown away as useless in times past. The uses of saw dust and waste wood have been wonderful. Here is something worth noting:—

"The Swedish journal 'Jernkorst' describes a process for converting waste wood at saw mills into dry saw-dust, which is carbonised, the liquid by-product distilled, and the charcoal made into briquettes. It is profitable, 9,000 tons of waste wood yielding 6,000 tons of briquettes at £3 6s a ton, beside fuel to drive the plant, acetate of lime, methyl spirit, and acetone."

Planting in Sumatra.—We commend the "Planting Notes from Sumatra" appearing in another column to the perusal of our readers. Coming from the pen of an old Ceylon Planter, and a true Highlander endowed with all the broad humour characteristic of his race the article makes diverting and lightsome reading. It is indeed cheering to see our old friend writing in such a buoyant spirit notwithstanding the inconveniences and discomforts of their railway system, &c. in Sumatra. Although we in Ceylon are ahead of them in so far that we are unable to outstrip the Government trains on bicycle and are independent of the gum bottle at the P.O., yet in the quality of their head gear they seem to be far in front of us. When "W.T.M'K." tells us of a tobacco planter indulging in that operation which has rendered the name of Oliver Twist immortal, "hollering for more," owing to his unability to afford a new hat as his commission for the year has fallen so low as £2,500, one wonders what kind of hats they wear in that country—probably gold frames, studded with jewels. If perchance any billetless Ceylon P.D. should wander towards this Eldorado it might interest our readers were he to let them know this through our columns.

"On Some New Species of Eucalyptus," by R. T. Baker, F.L.S., Curator, Technological Museum, Sydney.—There seems no end to the species of Eucalyptus. Mr. Baker describes some ten new species and gives a number of plates. Perhaps the most useful is:—

Eucalyptus Woollsiana, sp.now., "Mallee Box." —A large tree up to 80 feet high, and more than 3 in diameter. Bark persistent half-way or more than half-way up the trunk; smooth, chiefly of a rich brown colour. Timber.—Hard, close-grained, interlocked, heavy, durable timber, of a brownish colour. Useful for bridge-decking, posts, railway sleepers, and general building purposes. It is in great request at the Cobar mines for shoring the roofs.

"Annals of the Royal Botanic Gardens Peradeniya."—We have to acknowledge receipt of No. 2 of this publicaton, edited by Mr. J C Willis, M.A., F.L.S., containing *inter alia* papers on "Fungus Cultures in the Tropics" by Mr. C Holtermann; "Flora of Minikoi" by Mr. J C Willis; "The Botany of the Maldive Islands" by Messrs. J C Willis and J G Gardiner; "Observations on *Dracena reflexa*" by Mr. Herbert Wright; reviews, notes and supplement. In Carl Holtermann's paper on fungus cultures it is pointed out how it is possible with two solutions to undertake in the tropics many interesting developmental investigations; and Mr. Willis in his note on the "Flora of Minikoi" referring to Dr. Prain's statement that the plants hitherto known to grow wild or to be cultivated on the island number 113, says:—"During the south west monsoon of 1899 the island was visited by J Stanley Gardiner, in the course of his work on coral islands. A collection of fifty-three plants was made by him, and has since been worked out in the herbarium at Peradeniya by Mr. W de Alwis and myself; for determination of two or three doubtful specimens I am indebted to Dr. Prain. Sixteen new plants are thus added to the list, raising the total to 129 and there are also five others with doubtful names, but certainly other species. The total is therefore 134." Mention is also made of the visit to Male in October 1901 of Mr. F Lewis of the Forest Department who "made a large collection there and on two neighbouring islands, for which five further species, including the Baobab, have been added to the list. It is improbable that further survey of the islands would add many more species." The volume altogether is a most interesting one.

## OUR EXPORT, IMPORT AND SHIPPING TRADE FOR 1901.

### I.—EXPORTS.

In our review of the Export Trade of Ceylon for the year 1900, comparison with the preceding year was found unfavourable; but exports for 1901 compare favourably with previous years, so far at least as volume is concerned. Excepting coffee and cinnamon chips all our more important products show an increased export. For some exports prices ruled high, especially the products of the coconut palm, which as the year closed, advanced in value above all former records. Overtrading in one or two articles, which was a feature of 1900 and the earlier part of 1901, has practically ceased, and it is anticipated that business in the current year will be generally of a stable nature.

Exchange fluctuated somewhat during the year as the following rates prove:—

| | | | | |
|---|---|---|---|---|
| 6 months credits, highest | 1/4 9/16 | lowest | 1/4¼ |
| 3 do | do | 1/4 3/8 | do | 1/4 7/32 |

Again between credits and documents on payment bills the margin fluctuated only from 1/32 to 1/16. Money was not dear during the year and became very cheap towards the close.

Last year will be memorable for the passing of an ordinance making sovereigns legal tender for R15. Already a quantity of gold has been imported from Australia and deposited in the Treasury, releasing silver for local circulation.

CARDAMOMS.—More land came into bearing during the year, and the crop exported is ahead of 1900 by 22,249 lb. The Indian demand was good, showing an increase of 26,407 lb. The better parcels went to London where the market has been a fairly good one for well-known marks. Exports aggregated:—

| | | | |
|---|---|---|---|
| 1899 | ... | ... | 499,959 lb. |
| 1900 | ... | .. | 537,455 lb. |
| 1901 | ... | .. | 559,704 lb. |

Over one-fifth of the entire crop appear to have been shipped in December, owners would appear to have heen holding for better rates.

CINNAMON.—Returns show the largest export of Quills yet recorded, notwithstanding which prices fluctuated very little, and remain at a high average. 54 cts. per lb. would appear to be the average price realised for usual assortment quills in Colombo, which must mean a good return to the grower. Germany is now the chief buyer both of Quills and Chips, the United Kingdom only taking second place, while Spain and America took large supplies compared with previous years. The continued increase in direct business with foreign countries is a marked favourable feature in connection with cinnamon, and planters may reasonably look for present values being maintained. The exports of chips was smaller, but prices were good, averaging from R70 to R72·50 per candy.

Most of the cinnamon shown as exported to America goes eastward to San Francisco, which is now becoming the port of distribution for Mexico and other countries of Central America, and the west coast of South America. Exports to America were:—

| | | bales. | |
|---|---|---|---|
| Exports | 1900 | 259,425 | Quills. |
| do | 1901 | 358,300 | do |

Total exports were:—

| | | lb. | | lb. |
|---|---|---|---|---|
| 1899 | Quills | 2,515,031 | Chips | 1,829,127 |
| 1900 | ,, | 2,678,111 | ,, | 1,863,406 |
| 1901 | ,, | 2756,270 | ,, | 1,516,083 |

Exports of wild cinnamon have practically ceased. Some old stock in London was reported as sold at ½d per lb. during the past year.

CINCHONA.—Market has been better of late, and returns show a small increase in shipments.

COCOA.—Crops gathered during the year were large—the largest on record—and there were shipped 49,459 cwt. against 33,476 cwt. in 1900. Quality on the average has not been good, and prices ruled low both locally and in London. Well-known marks, which as the year opened were selling at R55 to R57·50 per cwt., were at the close to be got for R45 to R47·50 per cwt. Out of the total export of 49,459 cwt. there were shipped to the United Kingdom, mostly for spot sale 42,344 cwt. More direct business with foreign countries is very necessary, and our American and Continental Commissioners ought to be addressed on the point by the Planters' Association. Total exports were:—

| | | | |
|---|---|---|---|
| 1899 | ... | .. | 42,745 cwt. |
| 1900 | ... | ... | 33,476 ,, |
| 1901 | ... | .. | 49,459 ,, |

COCONUT PALM PRODUCTS show a large increase in shipments compared with 1900. Crops were generally reported as small, owing to unfavorable weather during the preceding 12 months, which if generally correct, would, in view of the exports detailed later on, go to prove that a considerable acreage must have come into bearing during the year. Short supplies of copra from the Philippines, the Straits and other main sources of supply for the copra oil mills of the Continent, brought about a rapid advance in Europe for copra and oil, as the year closed, which was followed here by a rise in value above any previous records. In reviewing trade for 1900 we predicted a continued good demand for these products, and although present extreme prices cannot be expected to last very long, everything points to a steady demand at high rates during the year just entered upon.

A., COCONUT OIL fluctuated in price during the first half of the year, and then advanced rapidly, more especially as the year closed. The following prices ruling during the year are of interest:—

| 1901. | | | per ton. |
|---|---|---|---|
| On | 1st Jan. Coconut oil was worth | | R325 |
| | 1st April | do | 335 |
| | 1st June | do | 322·50 |
| | 1st October | do | 375 |
| | 31st December | do | 445 to R437·50 |

The latter transactions marking the record prices paid in Colombo. The danger of a continuance of present values for any time,

would be the natural tendency for consumers to adopt other greases as substitutes.

| | | |
|---|---|---|
| Exported in 1899 | .. | 400,979 cwts. |
| do 1900 | ... | 443,959 do |
| do 1901 | ... | 453,531 do |

The United Kingdom took over 50 per cent of exports, India coming second, whilst the America offtake shrunk to 1,360 tons. The year 1892 still remains the record year for quantity exported, viz. :—550,977 cwts.

B. COPRA.—The rise in value during the year was remarkable :—

| | | | |
|---|---|---|---|
| On 1st Jan. | Calpentyn was worth | R45·50 to | R46 |
| 1st April | do | 48 to | 48·50 |
| 1st June | do | 49 to | 50 |
| 1st October | do | 55·50 to | 56 |
| 31st December | do | 62 to | 62·75 |

with every prospect of high rates being paid for a few months of this year. The cause of the advance has already been explained under the general heading of coconut palm products. Germany was by far the largest buyer, France, Belgium and Russia following; India took only 1,487 cwts. Owners of coconut property have every reason to be satisfid with the year's working, in view of the increase in acreage which came into bearing.

C., POONAC.—A rise in export of poonac naturally follows an increased export of coconut oil, 10,218 tons being shipped last year, compared with 9,299 tons in 1900. Prices ranged from R70 to R80 per ton in robbins. Offtake is practically confined to Belgium and Germany.

D. DESICCATED COCONUT show an increased export last year.

E. COCONUTS show a trifling decrease compared with 1900.

F. COIR ROPE, YARN AND FIBRE.—Rope and fibre show an increase, but yarn shows a slight decline.

COFFEE.—This continues to shrink in volume. Ceylon's small export still commands fair prices, when the enormous stocks from other countries (especially Brazil), and the low prices they command, are taken into consideration.

ESSENTIAL OILS.—Both citronella and cinnamon oil show an increased export over the preceding year.

PLUMBAGO.—The decline in values which was a feature of 1900 continued during the past year, but towards the close there was, if anything, a steadier feeling. It is understood that most of the dearly bought stocks have now been liquidated, and that the shipping of unsold lots for spot sale has been much curtailed. Nothing forms a stronger lever in reducing values than the shipping of plumbago for spot sale either in London, New York or the Continent. London was the largest buyer, New York, Hamburg and Antwerp following. Shipments were—

| | | | |
|---|---|---|---|
| In 1898 .. | 473,075 cwts. | In 1900 .. | 383,350 cwts. |
| In 1899 .. | 616,385 do | In 1901 .. | 453,267 do |

Prices obtained for most qualities must still show a good return to pit owners, as the following comparative figures for one recognised standard of lump will show.

| | | |
|---|---|---|
| In 1895 | .. | value R300 |
| 1896 | ... | do R325 |
| 1897 | .. | do R400 |
| 1898 | ... | do R600 |
| 1899 | ... | do R750 |
| 1900 | .. | do R900 |
| 1901 | .. | do R375 |

Up to 30th November last deliveries in London (largest buyer) exceeded imports, and when we remember that prior to 1895 fine, bright lump was considered dear at anything over R275, surely the position of this industry would still appear to be a good one. A careful study of prices and shipments for the past 10 or 15 years, should convince most readers that those who talk of present prices not paying miners, and of the great depression in the industry, cannot surely lay claim to an old acquaintance with the mineral either as miners or as dealers.

TEA.—This staple is so constantly before our readers by correspondence, by Association meeting minutes, by leaders, &c., that most are no doubt "fed up" with it. All we will, therefore, say here is that if planters do not go back to coarse plucking and give "real supervision" over the factory, there is hope for the future.

The following Chamber of Commerce returns are interesting :—

MONTHLY SHIPMENTS OF BLACK TEA FOR 1901, 1900 AND 1899.

| | | U. K. | Russia. | Continent. |
|---|---|---|---|---|
| From Jan. to Nov. | 1901 | 93,261,472 | 8,779,508 | 1,350,467 |
| Do | 1900 | 102,518,275 | 8.238,290 | 1,283 810 |
| Do | 1899 | 92,871,282 | 3,395,260 | 805,809 |

| | | Australia. | America. | All other ports. |
|---|---|---|---|---|
| From Jan. to Nov. | 1901 | 19,647.645 | 3.390,801 | 3,882,397 |
| Do | 1900 | 16,611,204 | 3.707,474 | 2,416.800 |
| Do | 1899 | 14,560,468 | 3 021,312 | 2,276,105 |

Totals.

| | | |
|---|---|---|
| 1901 | .. | 130,312,290 |
| 1900 | .. | 134,775,853 |
| 1899 | .. | 116,930,236 |

| | | | U. K. | Russia. | Continent. |
|---|---|---|---|---|---|
| Dec. | 1901 | ... | 12,235,867 | 830,226 | 139,520 |
| Do | 1900 | .. | 11,241,918 | 617,702 | 73,367 |
| Do | 1899 | ... | 11,076,842 | 554.478 | 80,391 |

| | | | Australia. | America. | All other ports. |
|---|---|---|---|---|---|
| Dec. | 1901 | ... | 990,563 | 313,534 | 366,244 |
| Do | 1900 | ... | 995,708 | 273,206 | 453,885 |
| Do | 1899 | .. | 1,046,365 | 58,690 | 147.154 |

Totals.

| | | |
|---|---|---|
| 1901 | ... | 14,875,954 |
| 1900 | . | 13,655,786 |
| 1899 | ... | 12,963,920 |

MONTHLY SHIPMENTS OF GREEN TEA FOR 1901.

| | U. K. | Russia. | Continent. |
|---|---|---|---|
| From Jan. to Nov. 1901 .. | 222,006 | 37,337 | 6,825 |

| | Australia. | America. | All other ports. |
|---|---|---|---|
| From Jan to Nov. 1901 .. | 2,976 | 786,010 | 28,609 |

Total.
1,083,763

| | | U. K. | Russia. | Continent. |
|---|---|---|---|---|
| Dec. | 1901 | ... 15,225 | — | — |

| | | Autstralia. | America. | All other ports. |
|---|---|---|---|---|
| Dec. | 1901 | .. — | 11,786 | — |

Total.
27,014

## II.—IMPORTS.

Exchange fluctuations during the year show demand remittance ranging from 1/4 ⅛ down to 1/3 29/32. 30 d/s paper London on Colombo on the other hand was steady, highest rate being 1/3 13/16 and lowest 1/3 ¾. Money was easy, compared with preceding years, and more especially so for the last six months. Money at short call would only command 3 per cent. as the year closed.

The past year was one of concern to importers, more especially from April to September when the suspension of a number of traders in the Pettah gave cause for some alarm. Overtrading on the part of many dealers in 1900 was the cause of the deadlock; but most of the stocks held against dishonored bills are understood to be liquidated by now, and it is hoped business during the current year will be better. It is thought that the experience of the past year of several exporters and Commission Agents in Europe trading direct with the Pettah will curtail business of this kind in future. During the past year the Chetties owing to some dispute with the brokers of importing houses, refused to buy goods unless sellers accepted demand notes in payment of goods, in place of in notes at a fixed usance as had formerly been the custom of the trade. A compromise was arrived at, and those firms which prefer notes at a fixed usance obtain them readily enough from the Chetties. An Importers' Association was formed during the year with the object of furthering their interests. Some appear to be of opinion that a special Sub-Committee of the Chamber of Commerce on Imports would be sufficient to protect their interests. The greater the number of Associations or bodies the mercantile community is divided into, the less influence each can bring to bear on mercantile affairs.

Cotton Goods—From the Customs Returns—which are now issued monthly to subscribers—we find that for the 11 months ending 30th November last, only 11,961 packages of cotton goods were imported against 19,542 during the corresponding period of the preceding year, or a shrinkage of 38 per cent.

Locally the offtake has been comparatively small. The following are details of importations of cotton goods for the past 11 months of the last 3 years:—

| | 1899. | 1900. | 1901. |
|---|---|---|---|
| Grey Cottons ... | 2.628 | 5,198 | 3,956 |
| White do ... | 2,259 | 4,135 | 2,304 |
| Printed do ... | 1,142 | 835 | 1,344 |
| Dyed do ... | 91 | 1,720 | 2,418 |
| Colored Woven do | ,572 | 7,441 | 1,661 |
| Sundry Cottons ... | 112 | 81 | 82 |
| Yarn Plain ... | 1 | 30 | 48 |
| Do Dyed ... | 171 | 102 | 148 |
| | 15,976 | 19,542 | 11,961 |

Cotton as the year opened was worth 5 12/32 (Mid Uplands) and fell during the year to 4¼, but rose again to 4 9/16 before the year closed

Prints.—A considerable clearance of prints at reduced rates was reported at the close of the year.

Woolen Goods.—The importation of woolen goods was overdone during the latter part of 1900 and early last year, but the consumption of flannel and cloth of woolen and cotton mixture is increasing among Burghers and Natives, and if future importations are kept moderate. present stocks should be re-realised readily, although prices shewed an easier tendency during the latter half of the year. Importations for 1901 show a considerable increase over 1900.

Tobacco.—The consumption of tobacco has been heavy. For eleven months last year 11,124 lb. were entered for home consumption against 6,519 lb. during the corresponding period of the previous year. The large force of troops and prisoners in Ceylon is no doubt responsible for the increase. The consumption of cigars also shows an increase.

Malt Liquor and Spirits.—Here we have a large increase in quantities bonded and entered for home consumption. The figures from 1st January to 30th November are :—

| | Bonded. | Entered for Home consumption. |
|---|---|---|
| 1900 ... | 14,637 pkgs. | 12,978 pkg. |
| 1901 ... | 18,176 ,, | 15,253 ,, |
| | Increase 3,539 ,, | Increase 2,275 ,, |

The increase is chiefly on malt liquor in bulk for the use of European troops, and in cased gin and whisky.

Wines.—Especially French wines in cases show a considerable increase.

Matches.—The prices of these remained fairly steady all the year, but for a short period they could be purchased for considerably under the laid down cost. According to the Customs returns the importations show a large falling-off compared with 1900. In the 12 months of 1900, 287,484 gross were imported, of which 287,434 were entered for home consumption, whilst the first 11 months of 1901 show importations amounting to 72,983 gross only, of which 72,833 were entered for home consumption. The falling-off in importations may be attributed to large stocks having been carried over from 1900.

Cement.—Here again the quantity imported in 1900 greatly exceeded that of 1901. In the 12 months of 1900, 114,820 cwt were imported against 82,882 cwt for the first 11 months of 1901. Prices were very firm, the greater part of the year, but towards the close they were from 7 to 10 per cent easier.

METALS: Tea Lead.—Importers of this possibly suffered some loss during the year, owing to the great drop which occured in values. Locally at the beginning of the year 4-oz. lead fetched R390 per ton, while at the close of the year it could be purchased for R290 per ton.

Bar Iron.—Prices here were lower at the close of the year than they were at the beginning by some 15 per cent, whilst the reduction in price which has taken place since January 1900 is about 50 per cent. Although values are so much lower, the quantity imported in 1901 is *not half* that of 1900. In 1900 no less than 2,806 tons were imported, against 863 tons for the first 11 months of 1901. The reduction in price is more marked in Belgium than in Scotch or English brands.

Angle and Swedish Iron.—Swedish iron dropped some 22 per cent in value during

the year. Against 1,007 tons imported in 1900, 270 tons only were imported in the 11 months ending 30th November, 1901.

HARDWARE.—Under this heading the Customs returns give the value of imports in 1900 as R1,727,225, whilst the value for 11 months of 1901 is R888,920. This falling-off is no doubt due to over-trading in 1900.

RICE.—The quantity imported during the year is somewhat under figures for 1900, but the shrinkage is trifling. Prices fluctuated very little during the year.

COALS.—Imports of coal up to 30th November of last year aggregate 598,721 tons against 590,099 tons for the whole of the preceding, year, showing an increase of 8,622 tons for 11 months of last year over the whole import of 1900. Indian coal did not make such a great stride last year compared with 1900 as the latter year did compared with preceding years; still the import of Indian coa keeps increasing in volume.

Prices were comparatively cheap, and during the year just entered upon, steamship owners are reckoning on a "small coal bill."

## SHIPPING.

### CEYLON EXPORTS IN RELATION TO FREIGHT AND TONNAGE 1888-1901.

The following figures—compiled from the Ceylon Chamber of Commerce annual returns of exports and shipping—give the quantities of cargo exported fro Ceylon, and the number of vessels by which this cargo was taken. In this instance the Chamber's figures are reduced to "Shipping Tons" according to the Ceylon tonnage scale.

Readers must bear in mind that cargo brought for transhipment in bond at Ceylon ports is not included in our returns:—

| In Year. | No. Vessels cleared with cargo. | Cargo taken in Shipping tons. | Average taken per vessel. tons. |
|---|---|---|---|
| 1888 | 573 | 120,431 | 210 |
| 1890 | 698 | 156,159 | 223 |
| 1891 | 872 | 174,316 | 200 |
| 1892 | 871 | 200,986 | 230 |
| 1893 | 848 | 197,823 | 233 |
| 1894 | 808 | 200,489 | 248 |
| 1895 | 784 | 213,843 | 272 |
| 1896 | 830 | 216,844 | 261 |
| 1897 | 756 | 245,830 | 325 |
| 1898 | 773 | 297,211 | 384 |
| 1899 | 856 | 293,507 | 343 |
| 1900 | 826 | 316,004 | 382 |
| 1901 | 984 | 309,716 | 314 |

These figures show a nett decrease last year of 6,288 shipping tons, compared with the year immediately preceding, but they are well ahead of all other former years. The following are the more noticeable fluctuations last year compared with 1900:—

| | | | Shipping tons. |
|---|---|---|---|
| Tea | shows a decrease of | | 2,133 |
| Cinnamon Chips | do | do | 560 |
| Coir Yarn | do | do | 1,935 |
| Palmyra Fibre | do | do | 923 |
| Copra | do an increase of | | 3,870 |
| Desiccated Coconuts | do an increase of | | 450 |
| Plumbago | do an increase of | | 3,495 |

As coir yarn when in ballots only pays half freight, the falling-off in this is not of so much importance to shipping.

Grouping together the products of the coconut palm—coconut oil, copra, poonac, coconuts, desiccated coconut, coir rope, yarn and fibre—we find last year shows 128,243 shipping tons, and the following figures for previous years in connection may interest readers:—

COCONUT PALM PRODUCTS EXPORTED.

| | Shipping tons. | | Shipping tons. |
|---|---|---|---|
| 1888 | 61,375 | 1896 | 80,570 |
| 1891 | 69,879 | 1897 | 100,614 |
| 1892 | 94,550 | 1898 | 139,334 |
| 1893 | 79,935 | 1899 | 119,154 |
| 1894 | 85,711 | 1900 | 135,137 |
| 1895 | 84,567 | 1901 | 128,243 |

Of the total exports last year,

Tea gives 47½ per cent of shipping tons;

Products of the coconut palm 41½ per cent shipping tons;

Plumbago 7 per cent of shipping tons;

Other products 4 per cent of shpping tons.

These figures show how dependent is tonnage calling at Ceylon on the tea and coconut industries.

The number of vessels which cleared with cargo last year was 984 compared with 826 in the preceding year. Tonnage was in ample supply all the year round with the exception of an occasional tightness for Australian ports. As the carrying capacity of most steamers calling—especially those of the regular lines—is yearly increasing, exporters have good grounds for relying on ample tonnage being in supply during the current year.

Freights ruled on the average low all the year round, if we except those to Australian ports—as the following table will show:—

| | Rough Cargo. | | Tea. | |
|---|---|---|---|---|
| | Max. rate. | Min. rate. | Max. rate. | Min. rate |
| London | 20s. | 10s. | 25s. | 20s. |
| Antwerp | 20 | 10 | 25 | 20 |
| Hamburg | 20 | 10 | 25 | 20 |
| Marseilles | 20 | 10 | 25 | 20 |
| Genoa | 20 | 12/6 | 25 | 20 |
| Trieste | 25 | 20 | 25 | 20 |
| New York | 32/6 | 27/6 | 35 | 32/6 |

The exorbitant rates of freight ruling last year from Colombo to Australasia are still in force, notwithstanding the frequency with which these are commented upon in the press. How to get a reduction, to put the Ceylon tea exporter on a level with the exporter of China tea to Australasia, is a question which should receive the early and earnest consideration of the Planters' Association and the Chamber of Commerce. The following are fluctuations in rate of freight on tea to London during the last decade:—

| | Max. | Min. | | Max. | Min. |
|---|---|---|---|---|---|
| 1892 | 35 | 15 | 1897 | 35 | 10 |
| 1893 | 30 | 12·6 | 1898 | 40 | 20 |
| 1894 | 35 | 20 | 1899 | 30 | 25 |
| 1895 | 30 | 17·6 | 1900 | 30 | 25 |
| 1896 | 25 | 7·6 | 1901 | 25 | 20 |

Among the more important articles (produce and manufactures of the island) not so far enumerated in the Chamber of Commerce returns of exports, we notice:—

Unmanufactured tobacco, 2,785,164 lbs. for eleven months of 1901,

Arecanuts, 92,538 cwts. for eleven months of 1901.

These two important exports are chiefly shipped to Southern India, and provide tonnage for native craft.

Exports by native craft are not included in these returns-

## THE COCONUT PALM INDUSTRY IN CEYLON:

### DISTRIBUTION OF OUR COCONUT PRODUCTS.

Our annual review of the distribution of the various products of the coconut palm, as shown in our Export Tables, should be of increasing interest, as the Coconut industry advances. So far, its progressive development has been nearly continuous, and has received no check, such as has been experienced in connection with most of our exports—such as coffee, tea, cinnamon, and even with so useful a mineral as plumbago, of which Ceylon holds practically the monopoly. Not that Coconut proprietors have always escaped hard times, or that they have been exempt from the incidents which attach to fluctuations in the market for Oil and other manufactures from the nut. The history of some, or perhaps most, of the plantations in the North and East of the Island tells a different tale; but notwithstanding these occasional set-backs, the extension of cultivation has steadily advanced—has, so far as we can ascertain, never been arrested even for a year,—and has made notable progress during the Administration of Sir West Ridgeway, especially in the new Southern Batticaloa district and in Chilaw and Puttalam divisions. Apart from European enterprise, a great reason for steady, continuous progress is that the industry is so largely in the hands of natives, that the palm is both food and shelter to them, and that, even if the European investor should be dissatisfied with the results—and many plantations in the Jaffna and eastern districts were planted but afterwards sold by Europeans—the native is content to go on planting and extending heedless of the time he has to wait for returns (in some districts as much as twenty years!), and of the smallness of those returns as viewed from the European standpoint. Time is of no consideration to him; to luxuries he is indifferent; his wants are small; and the habits of the tree correspond with his own characteristics. It needs little attention and less cultivation.—though responding handsomely to both,—and if he fail to pluck the fruits off it, his children will do so, and to them it will be a source of sustenance, if not of income, for scores of years; and that is all he cares for. It is this characteristic of the coconut industry—that it is an investment and not a speculation—which has ensured its steady growth; and though the growth and development of trade and commerce has once more brought the European capitalist into close relations with the industry—apart from the milling section of it, in which he has always held the lead—to the native the extension of Coconut planting remains what it always was, a safe investment of capital yielding perennial, even if slow and scanty, returns. During last year, however, the returns were far from meagre, chiefly owing to the brisk demand for Copra; and that is one of the reasons why special interest attaches to the figures we are now reviewing in pursuance of our annual programme.

The exports of Oil last year were about 10,000 cwts. in excess of those for 1900 when we sent away 443,959 cwts. and were the largest on record, if we except 1892 when the quantity ran up to 550,797 cwt. We are unable to say off-hand what the circumstances were which led to an out-turn of Oil ten years ago which has seldom been since approached within 100,000 cwt.; but it is of importance to remember that the exportation of Copra at that time was only about one-third of the figures reached during the last four years, and that the trade in Desiccated nut was then in its infancy. The mother country continues to be our largest customer for Oil, having taken 236,514 cwt. or somewhat more than a half of our total exports; but the proportion shipped to the United Kingdom was larger in 1900, notwithstanding a smaller local out-turn. It is satisfactory to find that the falling off in the exports to the mother-country though it is neither very heavy nor indicative of a shifting of the trade into other channels, was more than covered by the increase in the quantity of Oil which her great Indian Possessions took over no less than 141,139 cwt.—quite a record quantity—found its way to our big neighbour; and it is undoubtedly matter for congratulation that we have a customer close at hand to take over one of our chief products at the exceptionally high prices which ruled last year. Thus, considerably more than three fourths of our total out-turn of Oil was taken by the United Kingdom and India! The former, no doubt, took it chiefly for distribution; but were India's requirements only or mainly, for local consumption? Some curiosity on this point might well be felt when we see that America has had only 27,205 cwt. direct from here, while on one occasion at least she had nearly four times that quantity! The suspicion that part at least of our shipments to India found its way to other countries, as Cochin Oil which, somehow, commands higher prices than Ceylon Oil, is not unreasonable. Our other big customers for 10,000 cwt. and upwards, were Germany, Italy and Austria.

As with Oil, so with Copra, the figures for 1901 were the largest on record, save for one year; and the year of largest exports in regard to Copra was 1898, when the phenominal quantity of 506,277 cwt., or 60,000 cwt. more than for the previous seven years combined, was sent away. Germany was our largest customer for Copra last year, having taken 153,335 cwt. out of 439,865—or considerably more than one-third the total exports—and has thus displaced Russia which had hitherto held the lead; but probably the Copra finds its way yet to Russia from German ports. Both France and Belgium, with

98,944 and 68,859 cwt. respectively, stand ahead last year of Russia which has 66,246 to its credit. The United Kingdom comes sixth on the list, with only 19,816 cwt.—evidence, we fancy, that the local Copra trade is passing out of British into Continental hands. In Desiccated Coconut the mother-country easily leads the way with over ten million lb. to her credit out of fourteen millions exported; and she is followed by Germany with 1¼ million, America and Australia coming next with nearly a million, and three-quarter million lb. respectively. Belgium took one-half of the 204,256 cwt. of Poonac we exported, and Germany 93,577 cwt. leaving only 8,462 cwt. for the rest of the world, of which the United Kingdom had 7,960. In Coconuts again the mother-country led, having absorbed 11½ millions out of less than 15 millions sent away, followed by Africa with over 1½ million. Germany was bad a third with 845,000, followed by India with 741,000 nuts. The distribution of our Coir exports calls for no special comment; but we must express satisfaction at the growth of the Fibre industry—the quantity sent away last year being 122,826 cwt. the largest on record, or 7,800 cwt. in excess of the exceptionally heavy shipments of 1900.

## AN INTERESTING REPORT BY PROFESSOR HERDMAN.

We have to acknowledge, with thanks, a copy of the fifteenth annual Report of the Liverpool Marine Biology Committee and their Biological station at Port Erin, Isle of Man. The report is prepared by Mr. W A Herdman, D.SC., F.R.S., F.L.C., F.R.S.E., who will shortly be in Ceylon to report on our oyster beds. Profusely illustrated it deals with a variety of subjects and is in many respects fascinatingly interesting. At the outset the writer says:—

The most important event that falls to be recorded this year is the arrangement concluded with the Government of the Isle of Man, as a result of which we shall in future occupy increased Laboratory accommodation and be responsible conjointly with a committee of the Tynwald Court for the conduct of a large Aquarium and Fish Hatchery.

Proceeding he says that:

During the past year the usual work, both educational and in research, has been carried on steadily. A party of students and investigators occupied the Laboratory in the Easter vacation, and several collecting excursions were arranged for their benefit.

Dealing with Fishery work the report states that:

Although a certain amount of work, both directly and indirectly bearing upon local fisheries, has gone on in the past at Port Erin, it is evident that much more will have to be done in the future. In the past we have had, for example, the experimental hatching of various flat fish and Gurnards and the experimental and observational work on Oysters and disease, but in future fish hatching and lobster rearing will be undertaken on a large scale in the new hatchery, and various fisheries problems will be investigated in the adjoining Aquarium and Laboratory.

The report, as we have indicated, is interesting and the "wonders of the deep" unfolded even in the illustrations are very marvellous. We feel sure from the evidences betrayed in this report that if anything can be done to revive our dormant pearl industry Professor Herdman is the man most likely to devise the means whereby that end can be attained.

## THE INTRODUCTION OF STEAM MOTOR "LORRIES."

### A LONG-FELT WANT IN CEYLON TO BE SUPPLIED.

An undoubted drawback in many parts of our island has been the want of proper passenger and transport facilities. Some districts, it is true, have had fairly good coach services established; other districts are very inadequately and irregularly supplied by the primitive as well as slow process of bullock carts, while other districts leave each individual to provide his own means of transport. The want has latterly become more acutely felt, and all who have the interest of progress at heart will, we feel sure, hail with pleasure the announcement that steps are being taken and that ere many days have passed the public will be invited to take shares in a Company to be known as "The Ceylon Rapid Transit Company Limited," and the object of which will be to import into Ceylon Steam "Motor Lorries" and to institute services of such between certain specified districts. Messrs Boustead Bros are interesting themselves in the venture, and in conversation with Mr Money of that firm, a representative of the *Observer* learned the following particulars:—During the last four or five years, said Mr Money, the question of mechanical transport on roads both for passengers and goods has been making tremendous strides all over the world and of course

MOTOR CARS

have been introduced and come into general use. The attention of manufacturers and others has been turned to the transport by waggons and carts, and as far as efficiency and promptitude are concerned they seem to be agreed that it is not equal to what is possible by mechanical means. The type of vehicle which has been found most successful for heavy transport is a vehicle propelled by means of steam and practically all the makers of these lorries for heavy transport have adopted steam as the most suitable means of propulsion. We know more of steam machinery than we do of the newer types of engines such as explosive engines, for instance. In Lancashire and in the North of England generally these lorries have been in constant use for the last four years and they have proved a very great boon on account of their large carrying capacity and the much higher rate of speed they are capable of compared with the ordinary lorry. There are in Ceylon a good many places where obviously it would be a very great advantage if one could effect transport more expeditiously than is done at present. There are districts where transports are carried on with very great difficulty by means of carts and it occurred to Mr Beamish, Engineer-Planter, in the Pussellawa district, who is the gentleman with whom the idea originated, to form this Transit-Company. Mr Beamish, who has taken an interest in the subject of road conveyance of this kind, was much interested in England in these lorries and it occurred to him that the time was ripe for introducing some such thing into Ceylon. Accordingly he ordered six lorries

when in England with a view to starting this Rapid Transit Company in which he himself is to take a large interest financially. It is proposed to commence operations on the

GALLE-MORAWAKKORALE

road. This road has been chosen to start with because, for one reason, it is a road on which there is a large amount of estate business which is directly available and has already been promised at certain definite ascertained rates. Again the conditions for working there appear to be favourable because there is no other means of transport except by carts which is most unsatisfactory and very, very slow when going the long distance of 53 miles. It has, therefore, been considered a good road to work as a commencement. The aim of the Company is by no means to confine itself to six lorries or to any one particular road or district. Having once made a start it is proposed gradually to extend our field of operations; to import more lorries and put them to work in every district wherever favourable opportunities are offered or seen to exist. Of course they will serve a useful purpose in many ways; for instance they will obviously serve as feeders to Railways and be of great importance in that way.

The prospectus of the new Company will be issued early next week and we hope that the capital will be wholly and rapidly subscribed. We congratulate all concerned on their enterprise, and, wishing them all success, hope that what proves a benefit to the districts in which the service will be instituted, may also prove of benefit to the energetic promoters.

## RECORD PRICES FOR COCONUTS.

From a well-known coconut planter, we have received the following interesting information :—

"Referring to the *Observer* of the 14th inst., the coconut crop gathered on this estate during November-December last was sold, on the 6th instant, for R52·62½ per mille, the September-October gathering having realised R50.12½ just two months before. On both occasions the buyers were Desiccators. Such prices, or anything approaching them, cannot be found in the records of the estate during the past 45 years: hence they were spoken of as 'record' prices. The next highest record was R47·87½ in March 1896.

"The prices got for last year's crops (there has not been a better year in this respect) ranged from R40 to R52·62½, an average for the six pickings being R44·35 and I doubt whether any other estate in the Negombo or Chilaw districts has beaten, or even equalled, this.

"Nuts of an estate in the Chilaw district, located close to Messrs. Vavasseur & Co.'s Desiccating Mills, are said to have fetched R53 early in January and a small parcel—probably not more than 30,000 to 40,000 nuts—of a Negombo estate, R54. It would be interesting to know the *average* prices on these places for the year. The demand for nuts has been great during the whole of the past 12 months and the supply has not been equal to it. The greatly-increased demand abroad for copra and poonac (the latter is now selling at R120 to R125 per ton) and the expansion of the trade in desiccated nuts are, I believe, the chief factors in the present high price of coconuts. The failure of last year's crop in Singapore is said also to have influenced the market.

"In September 1894 I sent, in response to your request, a table of the 'Value of Coconuts' from the year 1865 up to that date (published in the *Observer* and reproduced in *Tropical Agriculturist* for October 1894), and I now enclose figures from 1894 to 1901":—

VALUE OF COCONUTS IN NEGOMBO DISTRICT.

| Years. | Range of prices, per thousand per 12 months. | Average value per thousand for 12 months. |
|---|---|---|
| 1894 | R37 25 to R41·75 | R39·25 |
| 1895 | R36·25 to R46·25 | R39·88 |
| 1896 | R36·50 to R47·87½ | R39·44 |
| 1897 | R30·12½ to R33·62½ | R32·35 |
| 1898 | R31·00 to R36·00 | R33·92 |
| 1899 | R33·25 to R37·25 | R35·00 |
| 1900 | R32·50 to R39·12 | R34·96 |
| 1901 | R40·00 to R52·62½ | R44·35 |

## BORNEO PLANTING PROGRESS.

In North Borneo it is satisfactory to report progress and to tell of an increase in the Chinese population—a fact that in those latitudes makes for headway in the opening up of a country. The railway from Jesselton and Beaufort is within measurable distance of completion, and some progress made with the Beaufort-Tenom section, the opening of which, it is hoped, will lead to tobacco estates being started in that district. Tobacco still remains the leading staple. Rubber and gambier are receiving much attention, while excellent lighting oil has been struck at great depths. The labour problem has been helped by the arrival of Chinese coolies from Foochow, and of Hakkas from Hong Kong, and it is satisfactory to think that there is one part of the world that will not "be ruined by Chinese cheap labour." Indeed, that is its most urgent requirement.

In Sarawak there has been a great increase in commercial prosperity. The pepper crop, which is now finished, shows a large increase, and prices having been good, the planters have made money; and again a considerable number of new gardens have been opened. There has been some extension of gambier planting, but it is doubtful whether this is profitable on such prices as ruled during the first nine months of the year. We do not think the sago indusrty has been so profitable as before. There has been an increased business in timber for China, and a fair increase in the output of gold, to extract which further works are in prospect.—*L. and C. Express;* Jan. 3.

## GERMAN COLONIAL ENTERPRISE.

Amongst the first fruits of the German Empire was the scheme of colonisation which the late Prince Bismarck founded, and which Kaiser Wilhelm has assiduously nourished. Up to the present it has been a costly business to the German people, like everything else at the beginning, but he would be a bold man who would say that the policy is not good business. Germans are as fond of emigrating as anybody; why should they not have colonies of their own to live in? They are a pushing people in the way of business, and emulate the Britisher in regard to foreign trade, but have the advantage of starting where we leave off. In the matter of colonisation it may be possible to get a point from the working of their Colonial Department, espe-

cially that which is called Kolonial-Wirtschaftliches Komitee—that is, the commercial and scientific bureau which was founded in 1896. From the last report of this bureau for 1900 1901, we gather the following scientific particulars to show what the colonies are :—

German East Africa, with 6,000,000 inhabitants, exported 3,900,000m. worth of goods in 1899, and imported to the value of 10,800,000m, being a decrease in exports of 400,000m, and in imports of 1,000,000m.

The Camaroons, population 3,500,000, exported in 1898, 4,600,000m. worth of commodities, and imported 9,300,000m worth. The figures for 1899 are not yet available.

Togo, population 2,500,000, in 1899 had imports valued at 2,600,000m, and the exports were 3,300,000. In this, as in the case of the Camaroons, there was an increase over the preceding year.

German South-West Africa, 250,000 inhabitants, imported in 1899 to the value of 9,000,000m, an increase of thirty per cent over the preceding year and the exports were valued at 1,250,000m.

The South Sea Colonies, (Samoa, &c.) 500,000 inhabitants, and the exports and imports were about equal—namely, 2,700,000m of exports, and 2,800,000m of imports.

Kiaw Chou (China) has a population of 48,000, and for its size is the best possession, as the exports were valued at 4,000,000m, and the imports at 6,500,000m.

Thus the total population of the colonies 12,000,000 and the entire trade for the last year amounted to 60,000,000m. (£3,00,000.).—*Chemist and Druggist*, Dec. 27.

## DRUG TRADE REPORT.

London, Jan. 2.

Cinchona.—The shipments from Java during December amounted to 1,278,000 Amst. lb. against 1,091,000 Amst. lb. last year, 626,000 Amst. lb. in 1899. The total for the twelve months is 12,606,000 Amst. lb, against 10,741,000 in 1900, and 11,399,000 in 1899. The exports from Antofagasta (Chili) during 1900, amounted to 1,240 cwt.

Kola.—The following figures relate to the shipments from the Gold Coast :—

| | 1900. | 1899. | 1898. | 1897. | 1896. |
|---|---|---|---|---|---|
| Packages .. | 1,907 | 2.671 | 3,092 | 4,278 | 4,156 |
| Value £ .. | 43,132 | 57 020 | 35,789 | 37,869 | 33,278 |

Lemongrass Oil.—The lowest spot price is 7½d for ordinary Cochin, and 6d to 6¼d, c. i. f. nominally. For Java oil 8½d is asked on the spot.

Quinine.—There has been no business of importance this week, but the market has remained firm with small sales on the spot at 1s 1⅜d per oz. March delivery is quoted 1s 1½d,—*Chemist and Druggist*, Jan. 4.

## PROF. W. A. HERDMAN, F. R. S.

Says *Nature* :—Sailed for Ceylon on Dec. 26th, 1901, to undertake for the Government an investigation of the pearl oyster fisheries of the Gulf of Mannar. He is accompanied by a first rate assistant, and in Ceylon the Inspector of the fisheries and his staff will co-operate and provide boats and divers. A suitable steamer for dredging and trawling will be placed at Prof. Herdman's disposal by the Government of Ceylon and the necessary gear and apparatus for collecting and observational work, and for biological experiments have been sent out in advance. We understand that Prof. Herdman has arranged to take samples of the plankton throughout the voyage to Ceylon, and to launch current-floats at particular parts of the course.

## PLANTING NOTES.

Rice Culture—is regarded as no longer an experiment in Southwest Louisiana and South-east Texas. Although all records for drought and heat in those sections have been broken this season, more than an average crop of rice has been saved by the irrigation systems. The average yield an acre has been increased, the average quality has been greatly improved, and new varieties have been developed.—*American Grocer.*

Rice in Burma.—Though we do not obtain our rice mainly, or even regularly, from Burma, occasional attempts, more or less successful, have been made to lessen our dependence on India, and on the Chetties who practically monopolise the trade there. It is of interest, therefore, to see what an immense, and yet increasing, area is under rice cultivation in Burma. An Indian contemporary writes :—

The area reported to be under rice cultivation in the fourteen principal rice-growing districts of Burma is 6,461,649 acres, an increase of 152,616 acres, or 2·42 per cent over the area actually cultivated last year. The crop is reported to be in good condition in all districts. Heavy rain in the Araken division caused only slight damage. The outturn is expected to be slightly above normal, and the surplus available for export is estimated to be 2,200,000 tons of cargo rice equivalent to 37,288,135 cwt. of cleaned rice. A small part of this surplus will probably be used in Upper Burma.

Cattle Disease in India.—We cannot be too strict in our precautions against the introduction of disease from India. When vigilance has been relaxed, we have had outbreaks of small-pox and cholera in our midst—as is the case now in Jaffna; to which Dr. Rockwood has wisely drawn attention; but it is only very recently that steps have been taken locally to guard against the introduction of cattle disease from India. The following shows considerable divergence of opinion between authorities across the water, but it is well to on the side of caution in such matters :—

From Veterinary Lieut.-Holmes's Report will be noticed that cattle disease prevails in nearly every district of the Madras Presidency in a virulent form. Rinderpest in Ganjan and anthrax in Godaveri are perennial, and carry off thousands of beasts every year. The Madras Board of Revenue, in a resolution upon Mr. Holmes's figures, says : "Whilst admitting that the cattle mortality statistics show that most lamented losses occur from disease in this Presidency, the Board does not consider that it has been demonstrated that these losses are preventible by any method at present practicable, nor do the figures lend any countenance to the view that cattle disease was virulent during the period under notice."

# TO THE PLANTING WORLD.

# Seeds & Plants of Commercial Products.

**Hevea Brasiliensis.**—Orders being booked for the coming crop August-September delivery 1902, booking necessary before the end of April, quantities of 100,000 and over at special low rates. Plants available all the year round, 100,000 and over at special low rates. A leading Rubber planter in Sumatra, who purchased 50,000 seeds in 1899, and 100,000 in 1900, writes us, under date 15th November, 1900:—"I received your letter of 20th October, from which I learn that you added another case of 5,000 seeds to replace the loss, &c. I am satisfied hereby, and even after this adding I am satisfied by the whole delivery of this year." Special offer, post free on application.

**Castilloa Elastica.**—True superior variety cultivated in Mexico, seeds from specially reserved old untapped trees. Orders booked for August-September delivery 1902, immediate booking necessary; large quantities on special terms; Plants in Wardian cases.

A foreign firm of Planters writes under date 11th October, 1901:—"We beg to enquire whether you would procure us 100,000 Castilloa seeds, in which month we might expect them, and what would be the average price." Special offer, post free on application.

**Manihot Glaziovii.**—Seeds and Plants available all the year round, 100,000 and over at special low rates. A Mexican planter in sending an order for this seed wrote on the 22nd August, 1900:—"If they arrive fresh and germinate easily I may send you larger orders, as they are for high ground where the Castilloa does not thrive."

**Ficus Elastica.**—Seeds available in May-June; booking necessary before the end of March; also plants.

**Mimusops Globosa** (Balata) wood of the tree is much sought for buildings, fruits sweet like a plum and eaten, oil from seeds, said to yield as much as 45 lbs. of dry rubber per tree per annum, the milk is drunk and when diluted with water used as cow's milk, grow from sea-level up to 2,000 feet, orders being booked for seeds and plants, price on application.

**Cinnamomum Zeylanicum** (Cinnamon superior variety).—New crop of seed in April to June; booking necessary before the end of February; also plants.

**Coffee Arabica, Liberian Hybrid** and **Maragogopie Hybrid.**—New crop March-April; immediate booking necessary.

A foreign Agricultural Department writes dating 9th September, 1901:—"Please accept our order for 175 lbs. of Tea seed and for 2,000 Coffee beans. In regard to Coffee seed I would say that this will be the first importation made by this department, and we will leave the selection of the varieties to be sent to your judgment."

## OUR DESCRIPTIVE PRICE LISTS.

The following six Descriptive Price Lists are now being forwarded with Circulars and special offer of Seeds and Plants of Rubber and other Economic Products:—

1. Tropical Seeds and Plants of Commercial Products, enlarged edition for 1902.
2. Seeds and Plants of Shade, Timber, Wind-Belts, Fuel, and Ornamental Trees, Trees for Roadsides, Parks, Open Spaces, Pasture Lands, Avenues, Hedges, and for planting among crops (Tea, Coffee Cacao, Cardamoms, &c.)
3. Seeds and Plants of Tropical Fruit Trees including Mango grafts.
4. Bulbs, Tubers and Yams.
5. Orchids—Ceylon and Indian.
6. Seeds and Plants of Palms, Calamus, Pandanus, Cycads, Tree and other Ferns, Crotons, Roses, Dracinas, Shrubs and Creepers.

**Special Arrangements** made with foreign Governments, Botanical and Agricultural Departments, Planters and others for supplying seeds and plants of Commercial Products in large quantities.

"SOUTH AFRICA."—The great authority on South African affairs of 25th March, 1899, says:—"An interesting Catalogue reaches us from the East. It is issued by WILLIAM BROTHERS, Tropical Seed Merchants of Henaratgoda, Ceylon, and schedules all the useful and beautiful plants which will thrive in tropical and semi-tropical regions. We fancy Messrs. Williams should do good business, for now that the great Powers have grabbed all the waste places of the earth, they must turn to and prove that they were worth the grabbling. We recommend the great Powers and Concessionaries under them to go to William Brothers."

*Agents in London*:—MESSRS. P. W, WOOLLEY & Co., 90, Lower Thames Street.

*Agent in Colombo, Ceylon*:—E. B. CREASY, Esq.

*Agent in British Central Africa*:—T. H. LLOYD, Esq., Blantyre.

*Telegraphic Address:*
WILLIAM, HENARATGODA, CEYLON.
Liber's, A.I. and A.B.C. Codes used.

J. P. WILLIAM & BROTHERS,
*Tropical Seed Merchants,*
HENARATGODA, CEYLON.


68

## PROFESSOR HERDMAN, F.R.S.

We give a hearty welcome to Ceylon to this distinguished scientist and his Assistant, Mr. James Hornell, and express the hope that their connection with the island may prove a pleasant, satisfactory and, indeed, eminently successful one. At the same time we most fully recognise the great difficulties and uncertainty which must attend the very important investigation and "culture" experiments entrusted to Professor Herdman in connection with our Pearl Oyster Fishery. All that science and experience can do, will, we may be sure, be done under his direction, and then as to results we must all hope for the best; while Mr. Herdman and his Assistant may tell us :—

"'Tis not in mortals to command success;
But we'll do more, Sempronius, we'll deserve it.

## W. D. CAROLIS' GREAT CEYLON LEATHER TRADE.

### AN ENTERPRISING AND SUCCESSFUL BUSINESS.

Slowly, but undoubtedly and surely, do the native capitalists of Ceylon seem to be acquiring the taste for commercial enterprise and that their efforts do not run in one groove is well-known; but many perhaps are not aware that Ceylon amongst its various enterprises, carries on a comparatively large trade in hides and leather with other countries—a trade which has been almost entirely developed and maintained by one firm of Sinhalese merchants, the well-known W D Carolis. Hearing that after the recent Paris Exposition, trade between Ceylon and other countries had increased in various articles, not to mention tea, a representative of this journal called at the leading "leather" house in Ceylon on Friday and was shown round the premises. To begin with, it should be mentioned that the firm of W D Carolis, has, by reason of its very extensive business, been carrying on trade in Kandy and Galle with head offices at No 18, Kayman's Gate, Pettah.

### A FULLY STOCKED WAREHOUSE.

At the Kayman's Gate warehouse one was surprised to see the amount and variety of leather and other articles stocked for sale and export purposes. Here was to be found the well-known, but expensive "Russian calf" exported together with high quality leathers from England and Austria in order to supply the varied demands of its customers. A large amount of English black kid leather was carefully stocked in cases together with fine-coloured leather called skivers for book-binding purposes. Fine Russian leathers with black and white English kid for boots and shoes hardly surpassed the excellent show made by the country manufacture of these leathers in Mr Carolis' own tannery. The black and brown country-calf seemed of excellent quality and in great demand locally as well as abroad. Special mention should, however, be made of the variety of fancy leathers procurable here. For instance, our representative was shown a crocodile skin cured and tanned in the firm's own tannery. It presented quite leathery properties, all the scales being softened so as to make the skin very pliable. These skins are said to be used for hand-bags, belts and even boots and shoes. Then there were cheetah skins and goat hides with bristles cured to a nicety and adapted for rugs and door mats. English buck-skin is exceedingly well imitated in a clever preparation of country elk hide cured and refined to such an extent that, to the uninitiated, it would appear to be the same as the imported article. This elk-hide is to be got in light brown and white colours and is largely used for boots and shoes. The skin of a large scaly field lizard of Ceylon shown here is said to have taken over a couple of months in the tanning. Then there was a stock of stout hides for machine belting, harness and such purposes. In order to make the establishment complete there was also a large stock of shoemakers' tools of various kinds and qualities, boot trees of all sizes and English make, and boot dressing. The varied nature of the orders received made it necessary long ago to establish

### A HARDWARE DEPÔT.

in No. 16, Sea Street where a large amount of carriage building requisites are available as well as other building articles. A special feature of of this depôt is the large and varied stock of paints available. Enamel paints and the dry article are imported regularly from England direct from the great works of Aspinall's and other houses, some of the paints being consigned solely to Mr W D Carolis. Amongst the articles sold here is also a large stock of estate tools and hardware such as enamelled household vessels, and here are also carriage varnishes of different qualities, brass cabinet furniture in a large variety, different cloths for upholstering purposes, oil cloths, brushes, mixed paints and even carriage shafts, not to speak of the many housebuilding requisites such as nails and screws, locks, window glasses, &c.

### A BOOT EMPORIUM.

If the large shoe depôt at No. 110, Main Street, Pettah, known as the Oriental Boot Emporium and belonging to Mr. W D Carolis, were established for the sole purpose of advertising its leathers by manufacture, then its purpose happens to have been easily gained for not only does the clever staff of Indian workmen here turn out some excellently made "feet clothing" for exhibition, but a brisk and profitable business is also done by them.

### THE LEATHER MANUFACTORIES.

The increasing demands of the trade only recently made it necessary for the firm to purchase a second tannery in order to retain its customers and over R20,000 is said to have been spent in purchasing a large tannery in Kandy, a place not unknown to leather merchants. But by far the most important portion of the business of this enterprising firm is carried on at Bambalabitiya where is

### THE LARGEST LEATHER MANUFACTORY IN THE ISLAND

This establishment is situated in fifteen acres of ground and the numerous buildings and pits where the important process of tanning is carried on cover over seven acres. There are about four large buildings in which are numerous cemented pits where the raw hide are put together with what is known as rewa-bark or *cassia auriculata* for the purpose of colouring and softening. About 100 hides are tanned in each pit, the process lasting from three weeks to two months. It was ascertained that

monthly about 30,000 cow hides, 10,000 buffalo hides and 2,000 sheep skins were tanned here. The large outside demands soon clear the warehouses. For instance, this morning our representative observed over 500 buffalo skins fully tanned and prepared being despatched to Messrs Clark Young & Co., for export. There was also observed in process of tanning the skin of a large boa-constrictor or rather python, certainly measuring over 12 feet. Also there were about 30 cheetah skins excellently cured and well adapted for rugs. Altogether W D Carolis' business established in 1879 and which has obtained seven Ceylon medals for its manufactures, not to mention a silver medal and bronze medal at the recent Paris Exhibition, is one of the most important houses, of the leather trade in the East.

## ABOUT JAVA COFFEE.

Mr. B F Sherburne writing in a recent issue of the *Eureka Standard* says :—

The first cargo of Java coffee has yet to be brought to the United States, but every grocery store in the country is selling what they believe to be the real article, sometimes mixed with imaginary Mocha. I was in the East India trade six years, sailing from Boston with a miscellaneous cargo to Batavia, Singapore and Penang. Part of the cargo I sold in Batavia, such as was in demand there, buying such prodnce as was required by our home market, going thence to Singapore and Penang for the same purpose, finishing our home cargo at the last-named port. While in Batavia I purchased, among other things, a few thousand Java bags, or pockets, that would contain half a picul (abont sixty-six pounds) of coffee; when in Singapore I would purchase a hundred tons or so of coffee, raised in Macassar, Rhio, and other islands (very good coffee too), employ coolies to pick it over, discarding all dirt and imperfect berries, I would then fill the Java bags and take it to Boston, where it was sold as "Java" coffee, and no one could tell the difference as there was no Java coffee to compare it with. The coffee raised in Sumatra is probably as good as that raised in Java, which is all shipped to Europe. But the Sumatra coffee is shipped to all countries, being bought at auction from the Dutch Government at their annual sales. The Dutch rule their subjects with an iron hand in India. In Sumatra, where the bulk of their coffee is raised for foreign shipment, the plantations are leased to the natives and an inspector visits them all and compels them to raise a certain amount of coffee on pain of having their plantations taken away from them. This crop the government agrees to pay a certain price for, to be delivered at the port of Padang, where agents of purchasers assemble to buy from the government at auction, and the difference between the price, or what it is sold for, and what the government gives the natives, is their profit. No purchaser can buy more than a certain amount at that time, all being served alike. From Padang the coffee is shipped to this country and Europe. It is nearly as good coffee as that grown in Java, and is sold as such in the United States.

## JAVA CINCHONA.

From the report for 1900 on the Government cinchona plantations at Java to hand, we learn that at the end of the year the number of plants standing in the ground was 2,930,000, compared with 2,567,000 at the termination of 1899. The increase was ~~not~~ attributable to the area under cultivation being extended, but to the filling up of the spaces in the existing plantations, and, but for the unfavourable weather prevailing throughout the 12 months, it would have been greater. In the nurseries the plants totalled 1,731,000 or 24,000 more than at the end of the previous year. The total area cultivated by the Government was 1,179 hectares (hectare=2·47 acres), consisting of: *Cinchona ledgeriana*, 744 hectares; hybrid species, 155 hectares; and *cinchona succirubra*, 280 hectares. The total crop for the year was 1,123,530 half kilos of bark, of which 756,907 half-kilos were shipped to Holland, 2,404 half-kilos were taken by the medical profession, and 364,219 half-kilos were handed to the Bandong Quinine Factory. With the exception of 2,336 kilos, of sulphate quinine delivered to the Government Army Medical Stores at Batavia, the production of the factory will be sold by auction during the current year at the latter city. The crop the previons year amounted to 798,991 lb., so that the increase was 324,539 lb. for 1900. The total expenditure for the whole year was 123,826 florins (florin = 1s 8d). The net profit on the sales of the prodnce of 1899 at the different auctions in Amsterdam in 1900 was 305,568 florins. During the year experiments were made with so-called "boengkil," the residue obtained in making oil from the *Ricinus spectabilis*; the beneficial influence upon the verdure and growth of the plants was very marked, and to a less degree upon the quantity of the alkaloid, in which a slight increase is noticed after the first year. In consequence of the greatly enhanced demand for this manure, its price has gone up 300 per cent, so that the directors of the Government cinchona plantations are planting the *Ricinus spectabilis* on considerable tracts of land, so as to be able to themselves prepare the "boengkil." The oil they will obtain can be utilised by the State railways. Other experiments were also made with chemical manures mannfactured at Rotterdam.

It will be remembered the first quinine factory in Java was established in the year 1899. The first of the public anctions took place on February 28th, when the average price realised was 23·24 florins per kilo—the price in London is given in the report as 1s 4d per oz. or 28·22 florins per kilo. In the subsequent monthly sales the price fluctuated somewhat, but in December it sunk to 19·07fl., when the London price was 1s 1½d per oz. or 24·25fl. per kilo. The total amount of quinine that changed hands was 29,506 kilos., and the average price realised for the whole year was 22.50f. per kilo. At first, as might be expected, the quantities obtained and the colour of the alkaloid were not all that could be desired, but, thanks to the zeal of the manager, Dr. Van Linge, the establishment is now not only obtaining an excellent yield, but is manufacturing a product that is able, says the report, to compete with the old marks. The report states that if the planters content themselves with a moderate crop, and limit the shipments to Europe, the produce of Java, which contains the highest percentage of quinine, will improve in price. At the various sales during the year the total amount of snlphate of quinine sold at Batavia was 29,505·80 kilos. The total shipments of bark from the whole of Java in 1900 were about 600,000 lbs less than in 1899, and the average percentage of alkaloid was also slightly lower, being 5·26 per cent., compared with 5·38 per cent At the 10 public auctions in Amsterdam last year, 5,262,142 kilos. of bark equal to 298,140 kilos. of quinine were offered; for the preceding year the figures are 5,583,393 kilos of bark eqnal to 271,259 kilos of alkaloid. The production of the whole world is stated to have been, in 1900, 8,367 metric tons, compared with 8,218 tons in 1899. The consumption of quinine for the whole world is estimated at 390 metric tons.

We ascertain from the report that the Government of British India has made arrangements for selling small packets of quinine—25 centigrams in weight—at the various post offices throughout the country, with the view of counteracting the ravages of fevers amongst the native population. This is an example

which the report hopes the authorities in the Dutch East Indies will follow, and it will probably lead to a further increase in the total consumption.—*British and Colonial Druggist*, Jan. 3.

## PROMISCUOUS PICK-ME-UPING.

Why a newspaper which is supposed to treat everything on *multum in parvo* principles should, within a few weeks, devote three columns of space to matters pharmaceutical is difficult to say. First of all the public were 'Daily Mailed' with nearly two feet length of printers' ink anent the Privy Council and the sale of poisons. Then someone signing himself Chas T King followed with a long account relating to the modern herbalist, and now a Mr Sidney Thompson contributes a column under the attractive heading of 'Pick-Me-Ups.' 'If,' he says, 'the ranks of our English novelists and playwrights contained a single realist of close observation and genuine strength, he would do his country a great service by showing in play or novel, how English men and women are ruining their health and discounting that of the generations to come by their reckless persistence with which they indulge in all sorts of promiscuous drugs and pick-me-ups.' He goes on to relate a conversation he had with an anonymous friend whose habit was to go to 'his chemist' every morning for his pick-me-up because 'one feels beastly limp you know and this chap understands my constitution so well.' Further enquiry from other friends, supplemented by information from a doctor or two, confirmed the writer in the belief that there was a growth in the alarming habit of self-drugging. One chemist professed to be able to 'tell you tales that would make your hair stand on end,' and goes on to say that 'A man was in here an hour ago, whose name you know who comes in every fortnight or so and buys a bottle of cocaine solution as big as this'—he touched a huge cut-glass decanter of perfume. He has his doctor's prescription all right, so we can do nothing. Another comes in at all sorts of times, and asks leave to come behind the counter for a moment to inject cocaine into his leg.' People, the chemist is alleged to have said, 'does themselves according to one or two obvious symptoms, and off they rush for a bottle of tabloids.' (What chemist would use the word 'tabloid' in this general manner ?) 'Some of the tabloids are really dangerous when taken indiscriminately. These things, for instance, that contain strychnine and iron and quinine—I always make purchasers sign the poison book for them, but plenty of chemists are not so scrupulous. People buy and take them by the dozen, with the result that their systems get full of strychnine, the arterial pressure is increased, with a probable resultant danger of aneurism, and they keep themselves in a constant state of mental excitement and irritation.'

Again we have a reference to tabloids later on in connection with an interview (also anonymous) with a doctor. The same doctor spoke bitterly of the evils of the tabloid drugs. 'A bad business for the doctors,' he said, frankly; 'but it's a thousand times worse for the public.' Asked how it was that people can procure poisonous drugs as alleged so easily he mentioned as a possible explanation, that it was once suggested by an ex-President of the Pharmaceutical Society, that if a customer wrote down what he wanted on a piece of paper and appended cryptic initials, a chemist would be justified in regarding the document as a prescription. The writer proceeds to speak of the use of opium, methylated spirit, Indian hemp, quinine, bromides, and winds up by asserting that we are fast developing into a nation of drug-takers.

And the public swallow this spicy conglomeration of anonymous conversations! Aye, the more readily, and someone professing to be a chemist—obvious of the advertising advantages of using his own name and address—writes to the paper referred to that 'I can say the extent of drug-taking today is simply appalling.'—*British and Colonial Druggist*, Jan. 3.

## THE SCIENTIFIC EXPEDITION TO THE MALDIVES.

### PROFESSOR DR. AGASSIZ RELATES SOME OF THE RESULTS.

Professor Dr. Agassiz and party, who in December last left Colombo by the B I ss. "Amra," for the purpose of exploring the Maldives, which formed the only group of Atolls, which this distinguished scientist had not hitherto seen, returned to Colombo late on 22nd January. It will be remembered that when Professor Agassiz arrived in Colombo, we were able through his courtesy, to give an account of his intentions in going to the Maldives. We have now pleasure in recording the work accomplished by the learned Professor as told by him to our representative :—'We were gone for little over a month," said the Professor, "and during that time my son and Mr. Woodworth took about 300 photographs, principally of coral reef subjects. Favoured with excellent weather—being only one day prevented from proceeding with our explorations—we were able to return to Colombo sooner than we expected. The principal thing we did was to

SOUND THE CHANNELS

between the lagoons and to develope the plateau on which the Atolls of the Maldives have been formed. We found as the usual thing that the principal atolls were separated by comparatively shallow water in the central part of the group, while towards the south, between Hadumati and Suvadiva and Addu, the depths were very much greater—nearer a thousand fathoms. We also ran a line to the Westward of Ari Atoll into fifteen hundred fathoms and one to the South-ward of South Male into twelve hundred fathoms, showing that the

PLATEAU OF THE MALDIVES IS MUCH STEEPER

on the West than on the East face. And again we also ran soundings between the Northern Maldives and Colombo and developed the fact that the Maldives are separated from the Indian continental slope by a deep bank of the ocean of more than fifteen hundred fathoms in depth. The aggregations of islands which had been called atolls or the Maldives are not atolls as such, with the exception of the Southern islands like Suvadiva, Addu, and Hadumati and some of the isolated islands like Goidu and Kardiva, as well as the Southernmost atolls of the Maldives. These are

ATOLLS IN THE STRICT SENSE OF THE WORD

and what has been called Ari Atoll, North Male and other Atolls of the Central part of the Maldives are only apparently Atolls as the land which binds them consists of a series of small Atolls which are just as much Atolls as the larger ones mentioned above. This is specially well developed in the northernmost parts, that is Miladumadu and Tiladumati, which, in fact, are nothing but a great plateau without definite outlines, on which Atolls exist, separated by spaces of 10 to 15 miles, just as they would be on any other plateau, while on the contrary, on the central part of the Maldives they are often

close together and separated by gaps of not more than three-quarters of a mile to a mile. This makes the

TOLLS OF THE MALDIVES SUCH AN INTERESTING SUBJECT

for those interested in coral reefs, for we found there the most simple and primitive conditions for the formation of Atolls which are found anywhere except in some parts of the Yucatan plateau in the West Indies. There are two or three small Atolls similar to those of the Maldives but no where do we find such an immense number of diminutive Atolls in all stages of growth, from a mere bank rising to a few feet above the plateau, to banks within five or six fathoms from the surface, or to banks which have just reached the surface and on which sandbanks or islets are beginning to form, so that it is comparatively simple to trace the whole development of these Atolls from the time they are bank until they form the Atoll as we understand it. One of th

GREAT REASONS OF OUR SUCCESS

in examining the Maldives has been that the Charts published more than 70 years ago are as accurate to day as they were then, and we were able to navigate through the intricacies of all the islands with the greatest confidence. The only changes we noticed were changes such as the washing away of banks or the formation of banks since the charts were published ; but these are changes without any special importance and it is

CERTAINLY ONE OF THE MOST CREDITABLE PIECES OF SURVEY

with which I am acquainted, as the survey must have been carried out under more difficult conditions than those under which a similar survey would be made at the present day. The conditions which exist to modify the atolls are very slight. The North East and South-West monsoons do not blow with anything like the violence with which the "tra des" blow in the Pacific where we found on the banks of the atolls an enormous swell, pounding everything to pieces and throwing up large blocks of Coral on the reef plateaux. In the Maldives the sea which is the result of the monsoons is comparatively of little strength compared to that of the Pacific swell. The

MALDIVES ARE BY FAR THE MOST INTERESTING GROUP OF CORAL REEFS

which I have visited as in less than fifty miles of any part of the Maldives one can see more atolls than there are in the rest of the world."

Professor Dr. Agassiz, who was accompanied by his son, Dr. Woodworth and Mr. Biglow, as assistants, received the greatest courtesy and kindness at the hands of the Sultan who provided him with a circular letter to the Chiefs requesting that they should give all assistance possible to the party. His Majesty also presented the Professor with an interesting collection of Maldivian curios before they left Male. Of Captain Pigott, who commanded the "Amra," Professor Dr. Agassiz speaks in the highest terms for the valuable assistance rendered by him.

The party, after a week's rest in Colombo, returned to America.

## SHIKAR AND TRAVEL.

### A NIGHT'S WATCH.

I could not persuade the Pakrind tiger to kill any of my 'ties up,' though six appetizing baits had been for some days fastened in the most likely places it might be expected to pass by. But its beat was a large one, which contained much undisturbed jungle, where apparently as it had not killed village cattle for some weeks, it was able to obtain as much food as it needed. There was no water inside the jungle, but roughly speaking, at the four corners of the area which was 14 miles long by 10 miles wide, water was to be found. At three of the corners there were small nearly dried-up village tanks, and at the fourth which was in the hills was a water-hole fed by a small spring (one of those over which a native *shikari* loves to sit and shoot unsuspecting does and fawns as they come to drink on a moonlight night). My only chance of a shot at the tiger seemed to be to sit over this hole ; it was a very remote chance certainly, but there were signs that the tiger had been in the neighbourhood some days before. and as I had to leave on the following day, I felt that I could not go away without having tried every means to bring it to bag. In the previous year I had tried for it, but had not been able to obtain a shot, though it had deigned to kill one of my baits. A month or two before I tried, it had been fired at, and I think slightly wounded by an officer of a native regiment who had left the wing he was accompanying on their march on relief along the trunk road some 10 miles away to try for the Pakrind tiger. Baits, beasts and bullets were therefore not new things to it when I arrived upon the scene, and it was clever enough to steer clear of all three.

The water-hole was, as I have said, in the hills. All around the jungle had been burnt and there was little covert between it and the thick grass and tree jungle in which the tiger usually lived, but it was approached by numerous gorges and ravines and was just the place to which game might be expected to come at night.

About 3 o'clock I left my camp having sent men on before me with a native *charpoy* which they were to fasten up over the water in the most convenient tree, and about 6 o'clock I reached the place. The water was not very abundant, and what there was, was very black and muddy, and looked most uninviting ; but I suppose it contained some saline properties which are always such an attraction to game. Some twenty yards away from the main water-hole there was a little in a hole in the bed of a ravine ; this was much cleaner-looking, but it did not seem to be resorted to by game so much as the mudhole around which were innumerable tracks varying in size from those of the little four-horned antelope to the large but old imprint of a big bull-buffalo, and some rather more recent marks of bison. There were no quite recent tiger tracks, but bear and leopard had visited the water on the previous night, and I hoped that even if the tiger disappointed me I might get a shot at one of the two latter animals. My *machan*, which was placed on a tree between the two water-holes, needed some additional screening before I considered it quite hidden, and it was nearly dark before I was settled in it. The moon which did not top the hills behind me until between 8 and 9 o'clock, was just past the full, but though the afternoon and evening had been cloudless, the night was not to be so. It might certainly have been a much darker night than it was, but every now and then a thick black cloud obscured the moon, and the water fifteen yards away, was not visible. I do not know who my first visitors were. About half an hour before the moon rose I heard some animals at the water lapping. They seemed smallish and may have been wild dogs, but they made no sounds save the lap-

ping, and next morning I could find no tracks to help me to identify them. As soon as the moon rose, and I could see a little, I had dinner, and as I finished I heard the sounds of a leopard about half a mile off in the valley below. A four-horned antelope that had been for some time near the water, but apparently rather nervous about drinking at last plucked up courage and waded through the mud to drink, and when the sounds of the leopard were repeated nearer and nearer, it gave its little barking call and scampered off. The leopard evidently did not want to drink, for though I heard it for nearly an hour, now a little nearer, and again a little further off, it never came within a quarter of a mile of me. The next sounds I heard were most weird. An appalling din arose about fifty yards behind me, as if a number of wild cats were fighting, but they never approached the water; at least I never saw them do so, and their identity remains a mystery. I must have dosed off for a few minutes for I suddenly became aware that there were some big animals walking about nearly underneath me, and cracking the dead burnt branches as they moved. They were evidently buffalo or bison, but which, I could not determine at first; however, the moon for a minute showed out clearly, and I saw that one drinking at the water was a bison. There were six of them, and they must have stayed at least twenty minutes within thirty yards of me; but it was not light enough for me to make out if there was a really good head among them, but they all looked enormous in the dim light, and it was a strange sensation to be so near to a herd of bison for so long a time without their being aware of my presence; had it been lighter, all their movements would have been visible, and the sight would have been still more enjoyable. Before the sound of the bisons' tread had died away, as they went down the valley, two bears came down from the hill behind me to the water. Of course they squabbled before they reached the water, and it was the sound of their quarrel that put me on the *qui vive*.

Apparently one of the pair had been worsted, for only one came to the water in the ravine to my left. I could easily make out a large black mass as the bear walked down the ravine side, and aiming at the front part of it I fired, my bullet fortunately penetrated the lungs and broke up these. To make certain I fired a second shot which broke the spine, and the poor bear's sobs ceased. Perhaps I ought not to have fired at the bear, but two-thirds of the night had passed and no tiger had appeared, so I took what the gods sent me. There was one more visitor to the water before the night was over and this was a sambhur stag. I could hear its antlers strike against the low branches of the trees as it came up and could just see its antlers as it drank, but the moon was much obscured, and I but hazily saw what with better luck would have been a magnificent sight. Then the east began to light up as the sun rose behind the hills, and I climbed down from my *machan* and inspected the bear, which proved to be a young male nearly 5 feet long.

And so the Pakrind tiger still remains to be shot.

—*Indian Forester.* LONG TOM.

## DISTILLATION OF RUHSA GRASS OIL, CENTRAL PROVINCES.

The grass, *Andropogon schœnanthus*, or Rusha grass, commonly known as "Tikhari," is a native of Central Provinces. It grows wild in swamps with erect culms, and attains a height of three to six feet. The leaves are long, smooth and tapering, and have a strong aromatic smell and pungent taste. The root, locally known as "Mirchia Gant," is perennial, with long wiry fibres.

The oil obtained from this plant has become an important article of commerce. It is now chiefly distilled in many parts of Central Provinces, especially in Betul, Nimar and Hosganbad districts, by private persons, and taken to Ellichpur town, which is the chief market of export. Its current price is from R2 to R4 a pound according to its purity. The grass is very abundant, and the distilling of the oil requires only a moderate skill and very small initial capital. About 50,000 (fifty thousand) pounds are exported annually from Bombay to Arabia, and European Turkey, Jedda and ports along the Red Sea. Its European name is Palma Rosa oil or Geranium oil.

The oil is chiefly used as an adulterant for *attar* of roses. In some places the roses are sprinkled with it and the *attar* is distilled. It is a proved fact, that "Rusha" grass oil does not solidify by cold, and this is the chief adulterant which stops the crystalizing habit of rose oil when exposed to low temperature and prevents its congealing.

Rusha grass oil should be first refined before it is ready for admixture with *attar* of roses. It is also necessary that it should lose its penetrating aromatic smell and acquire the colour of the *attar* of roses. In order to effect this change it is shaken with water, then acidulated with the juice of lemon, and finally exposed to the sun and air. The oil thus refined has a very slight difference from *attar* of roses, and can serve as an admixture which is very difficult to detect. It is very difficult in these days to procure pure Rusha grass oil, as the oil of commerce is more or less adulterated by the local distillers themselves. The chief substances to adulterate this are turpentine and the oils of ground nut, linseed-rape, &c., &c. By such adulteration the oil temporarily become turbid, but after a time it settles again and becomes clear. Pure oil should be of a pale sherry colour.

The oil, which is considered to be cooling and astringent, is used as a liniment in rheumatism, headache and skin diseases and has the property of curing baldness. It is a powerful stimulant when applied externally, but it is never taken internally, except in very minute doses for bilious affections. The grass, as far as I know, is not used as a fodder for cattle.

The grass generally flowers in October and November, and is then fit for cutting. It is tied into small bundles not exceeding twelve inches in circumference, and packed tight, horizontally, in a large metal cauldron, which is fitted on a rough masonry furnace, and then a small quantity of water is added. When full a roughly scooped-out wooded lid is put and sealed with a plaster of ground pulse, or the lid is more firmly fixed by means of metal clamps. Through a hole in the lid one end of a hollow bamboo is inserted and the other end passed into a small metal vessel, which is securely fixed under water in the bed of the river. This smaller vessel serves as a condenser, and the bamboo tube in it is kept in position by pieces of cotton cloth well wrapped round the tube and serving as a stopper for the condenser. The furnace is then heated and the vapour passing through the hollow bamboo tube is deposited as oil in the condenser. The oil thus

obtained contains a large proportion of water; five hundred pounds of grass yields two pounds of pure oil when the still is carefully worked, but if the grass in the cauldron is allowed to burn, it communicates a dark colour to the oil.

With better apparatus, and a more scientific method of distilling, there is much room for improvement and every possibility of success. It might be worth while, for experiment, to reserve for departmental working a certain area and to carefully supervise the results.

A. D. BHOET, Forest Ranger.

Hoshangabad, Sept. 13, 1901.

—*Indian Forester.*

## ANDAMANS,

The work of the Forest Department in the Andamans is shortly described in the following extract from the Government of India Resolution:—

"Forest operations in the Andaman Islands are mainly confined to the extraction of produce, and are limited in extent by the amount of convict labour that can be placed at the disposal of the Department. A large proportion of the available labour is employed in meeting the requirements of the settlement in timber, fuel and gurjan oil, which are considerable, so that only a comparatively small quantity of timber can be extracted for export. A trade has been established in London for Andaman padauk, but the demand is greater than the present supply, and it is believed that koko (*Albizzia Lebbek*) and other Andaman timbers would find a ready sale if they could be placed on the market in sufficient quantities. It is therefore important that advantage should be taken of labour-saving appliances whenever practicable, and experiments in this direction should be persevered with."

The labour-saving appliances alluded to are a tram line which was extended 150 yards during ing the year, a timber sledge road, the outlay on which is said to have been out of all proportion to its usefulness, and a wire ropeway which was not a success. Nevertheless the experience gained will prove useful, and as the steep hillsides of the Andaman valleys are said to be well adapted to a system of wire ropeways, this form of extraction is to be persevered in. There were no breaches of Forest Rules, and fire protection measures are unnecessary owing to the heavy rainfall and absence of herbaceous growth. Natural reproduction was unfavourable owing to short rainfall; and an area of 5 acres, which was sown with padauk and ironwood, was for the me as reason practically a failure; on the other hand, twenty-nine acres of maritime swamp were successfully re-stocked with mangrove seedlings. The Department supplied the Settlement with 25,484 tons of firewood and 5,773 lb of gurjan (*Dipterocarpus*) oil, the latter presumably for lighting. In Burma its use for this purpose almost entirely ceased many years ago owing to the cheapness of kerosine oil. The quantity of timber extracted was 5,808 tons, of which 2,446 tons were padauk. The average rate per ton realised for padauk squares in Calcutta was R195 or nearly double the price obtained in the previous year. In the London market this timber realised 6s 6d a cubic foot, koko (*Albizzia Lebbek*) and black chuglam (*Terminalia bralata*), 4s 6d each, and taungpeingye (*Artocarpus chaplacha*?) 4s. There appears to be a demand for all these species, which the Department is not at present prepared to meet owing to the labour difficulty. "Specimens of choice padauk taken from the junction of bole and main branch and from stumps, including crown of root, were sent to the Paris Exhibition. The branch and root pieces were cut into veneer on arrival at destination, and the latter were much admired, being valued at 9d to 2s per square foot, 1-16th of an inch thick." Probably many other Indian species could be profitably disposed of if worked up in this way. The revenue for the year was R2,91,115 and the surplus R1,49,309,—the highest but one on record.—*Indian Forester.*

## GERMAN SUGAR INDUSTRY.

Evidence continues to be forthcoming that the German sugar industry is confronted by a serious crisis, America has for the moment disappeared from the market as a buyer, and this has broken prices again. It seems evident, too, that the year's production on the Continent will be considerably greater than the estimate. Market experts calculate that there will be a surplus stock at the end of the sugar year amounting to 2,665,000 tons against 975,000 tons for the last season. Under the circumstances, it is already claimed that the reduction of 10 per cent in the acreage next year, as proposed by German producers, will prove inadequate; and that a 20 per cent reduction will be necessary. The German Sugar Syndicate is taking steps to promote consumption. At a meeting of the Syndicate the other day it was decided to give premiums to dealers showing the largest sales; and it was also voted to make special prices to chocolate manufacturers who would bind themselves to use only syndicate sugar.—*Madras Mail*, Jan. 22.

## BAD ADVICE TO THE CHANCELLOR OF THE EXCHEQUER.

WHY SHOULD TEA AND SUGAR BE TAXED.

(From the *Speaker*, Jan. 4th.)

When "R G" comes to advise the Chancellor of the Exchequer as to what should be the new taxes, he flounders, as he did last year, into the marsh of protection. The military occupation of South Africa is undoubtedly, he says, a new burden, and the whole army must therefore be increased in number and efficiency. Consequently "expenditure must be permanently increased," and "no reduction of the so-called war taxation is to be contemplated." "R G" next proceeds to declare, without adducing any proof, that "an increase of direct taxes is out of the question, because direct taxes are necessary as a reserve for emergencies, unless the rate is very low.' This is great nonsense, considering that the income-tax is not yet as high as in 1856, when the war expenditure, and therefore the emergency, was only about one-third what it now is, and "R. G." makes absurdity doubly absurd when he tells us that "the knotty question will perhaps be whether some new taxes of this kind (*i.e.*, taxes on food) should not be imposed in order to diminish the excessive

weight of the income-tax." We wonder if it has ever occurred to "R. G." to look into the scale of the license duties or to examine proposals for the taxation of ground values? If his outlook were not so restricted, and if his mind were not possessed by a desire to raise artificially the price of the necessaries of life, he would hardly have committed himself to the statement that "obviously to bring in money the Chancellor of the Exchequer is limited to taxes of the nature of the sugar duty, which he imposed last year." "R. G." obviously thinks that women and children should pay for war; it is a chivalrous doctrine, worthy of the City and of Printing House-square. We cannot for the life of us imagine why tea should be taxed up to double its natural market price when the State, through its magistrates, is giving away valuable monopolies in the shape of licences every year to the tune of many millions of money; but "it is safer," writes our City Pundit, "to trust to such things as tea and sugar or a moderate corn duty, such as we retained in our finance down to 1870. There is ample room in this direction for duties that will bring in many millions and leave the country no more burdened than it was thirty years ago, when the taxes were nevertheless light." If the Chancellor of the Exchequer should attempt such a policy as this, we may look forward to a period of profound industrial and political discontent. When the depression comes (and "R. G." expects it "during the next few months") the crisis of the unemployed will be loud enough and the position of employers will be painful enough; but if the situation is aggravated by the substitution of dear bread for cheap bread, with dearer tea, dearer sugar, and dearer meat, then the Government, which entered with so light a heart upon such a war, will find that it has brought the country to the verge of a revolution. The towns of England and Scotland are just beginning to awake from a hideous dream. Their poor went mad and drunk with their rich in 1899 and 1900. But in every class in every town there was a handful of men who kept their heads, who foresaw the misery which the war must bring, not only to South Africa, but to our own doors. These handfuls have been growing into multitudes, and they will become irresistible when once it is made clear by events that the British poor are to be pinched and starved in order that Park-lane may reduce wages in Johannesburg.

## THE LARGEST SUGAR PLANT IN THE WORLD.

Mr. R B Hawley of Louisiana, an ex-Congressman, and sugar planter in the Southern States, has become interested in a large enterprise in Cuba. A private syndicate of which he is the head has secured 64,000 acres of the finest land in Cuba which they intend to plant in sugar canes for export to the States. This has caused something of a sensation in planting circles, and the opinion has been expressed that the competition which will result will seriously affect the Louisiana sugar industry. According to the "Picaynne" Mr. Hawley has shipped to Cuba the largest sugar manufacturing plant that has been made in America, or, for that part, in the world. Tho name of the company is the Chapparra Sugar Company, its domicile New York, and the plantation is situated at Puerto Padre, Cnba, extending over many miles of territory and embracing 100 square miles of the finest sugar lands on the island. The crushing plant was built by the Whitney Iron Works, New Orleans, and consists of six Corliss engines, of 150, 250 and 30 horse power, two of each size. Two sets of nine-roller mills, with Marshall crushers in each, the rollers seven feet by thirty-four inches, fitted with hollow steel shafts, built at Bethlehem, Pa. This is only the crushing plant, and that alone was built here at a cost of something more than $150,000. The boilers were produced in New York. They are of 6,000 horse power, of the Babcock & Wilcox type, 40-tube boilers. The refinery plant was bought in Philadelphia, with the exception of one machine, which was proprietary, and had to be produced in Europe. The refinery plant consists of three 13-foot vacuum pans, two sets of triple effects, of the Lilly type, twenty-four crystallizers in motion, and twenty-four water-driven centrifugals. The capacity of the mills and refinery is 3,000 tons per day, and it is proposed to increase the plant at the earliest moment, as it will not be sufficient for the needs of the company another year. The Company has several locomotives, and a complete transportation plant on the island already, which will be extended as the land is gradually brought into cultivation. The Deming system of clarification is to be used in the refinery, and the inventor of the system is now building the plant for the Company at the Payne-Joubert works in New Orleans. This is the largest single consignment of machinery that has ever gone out of the city, and it is to be followed by more from the same source for the same Company. Altogether it will constitute the largest sugar cane crushing plant on a single plantation in the world.—*New Orleans Picayune.*

## PLANTING NOTES.

TEA.—With regard to tea-growing in the United States, the *Glasgow Herald* says:—"It will be interesting to see the practical result of the successful experiments reported in the official statement from Washington. It is, of course, likely enough that, in the vast variety of its soil and climate, the United States has good opportunities for the culture of the tea plant; but soil and climate are not the only important factors in the case. One most vital consideration is the cost of labour, and in regard to this, it is hard to see how America can compare with China, India Ceylon, or even Natal.—*Indian Witness*, Jan. 16

COFFEE.—One-half the world's production of coffee berries is brought to the United States. Americans are the greatest coffee drinkers on the face of the globe now, and every year the consumption of coffee is increasing here. Last year it was more than 80,000,000 pounds for the whole country or more than ten and a half pounds a head of the population. Germany and France together only consume half as much coffee. Germany, less than six and a quarter pounds per head, and France only four and a half pounds per capita. The United Kingdom used little more than half a pound of the berries per head of the population, but over there they made up for it by drinking more tea than any other nation. More than a million dollars is sent out of the United States every week in payment for coffee. South and Central American countries, which supply us with more than 6,000,000 pounds of coffee a year, get most of the money. Porto Rico, Java and the Philippines get almost all the Rest, but a little goest to Hawaii. Last year the total value of the coffee imported into the United States was about $60,000,000, and that was less than for several years, because the import price of coffee has fallen about one-half.—*Bradsteet's.*

## SIR HENRY GILBERT,

In our last issue we briefly announced the death of Sir Joseph Henry Gilbert, the able and devoted coadjutor of the late Sir J B Lawes, Bart., the eminent authority on scientific agriculture and chemistry. Sir Henry passed away at his residence at Hardpenden, at ten minutes past twelve o'clock on Monday morning, the 23rd inst., in the presence of his family.

Sir Henry, who had long been ailing, was first taken seriously ill in August last at Strathpeffer, Scotland where he had gone for his summer's holiday, being attacked by acute hæmorrhage, followed by nervous exhaustion and neuralgia of the stomach.

Sir Joseph Henry Gilbert was born at Hull, August 1, 1817, and was therefore in his eighty-fifth year, being three years the junior of Sir John Lawes. His father was the Rev. Joseph Gibert,, the author of several theological works. His mother Ann Taylor, of Ongar, who survived until 1866, was well known as an authoress of poems, writing originally with her sister under the names of Ann and Jane Taylor,

After his school education, and the loss of several years by a gun-shot accident, which much impaired his health and deprived him of the sight of one eye, Dr. Gilbert commenced his college courses at the University of Glasgow, where he had as contemporaries Sir Joseph Hooker and Dr. T Thomson the Indian botanist. Here, as elsewhere, he paid special attention to chemistry, devoting some time to analytical chemistry in the laboratory of the late Professor T Thomson. He next studied at University College, London, attending the classes of Professor Graham and others, and working in the laboratory of the late Dr. Anthony Todd Thomson. A short time was afterwards spent in the laboratory of Professor von Liebig at Giessen, where he took the degree of Doctor of Philosophy. Returning to University College, London, Dr. Gilbert was class and laboratory assistant to Professor A T Thomson in the winter and summer sessions of 1840 41, and attended other courses at the College at the same time. On leaving college, he devoted himself for a time to the chemistry of calico-printing, dyeing, ., in the neighbourhood of Manchester.

In June, 1843, Dr. Gilbert became associated with Mr. (afterwards Sir John) Lawes in the Rotibamsted investigations, and from that time until his death has been engaged as director of the Rothamsted field and laboratory experiments, which consisted of a systematic series of researches in agricultural chemistry and physiology of animals and plants. In the early part of his career at Rothamsted he was engaged in the manufacture of calomel in an old barn which served as a laboratory. At that time Mr. Lawes sought his services as chemist in some commercial undertakings, but Dr. Gilbert preferred to remain at Rothamsted, and commenced that brilliant series of researches which conferred so much honour on the two investigators. These researches began as "flower-pot experiments," but were gradually extended till they became field experiments on a scale hitherto unattempted.

The Rothamsted experiments may, indeed, be pronounced unique, and are certainly without parallel, either as to extent, character, or scientific and practical usefulness. It is not asserting too much to say that these researches have done more to advance agricultural and horticultural science, and have been and will be of greater service to agriculture than can ever be fully realised. Other countries can boast of very numerous agricultural stations supported by Government, whilst we have very few; but the Rothamsted experiments carried out by private individuals surpass all that has been done in any other country with or without Government aid.

Sir Henry was elected a member of the Chemical Society in 1841, the year of its formation, and was President of the Society in 1882-83. He was elected a Fellow of the Royal Society in 1860, and in 1867 the Council of the Society awarded to him, in conjunction with Sir John B. Lawes, one of the Royal medals. He received the honorary degree of M.A. at Oxford in 1844, that of LL.D. at Glasgow in 1883, and at Edinburgh in 1890, as also that of Sc.D. at Cambridge in 1894. He was Sibthorpian Professor of Rural Economy in the University of Oxford for six years, from 1884 to 1890.

In May, 1893, the President and Council of the Society of Arts awarded the Albert Gold Medal to Sir John Lawes and to Sir Henry Gilbert for their joint services to scientific agriculture, and notably for the researches which, throughout a period of fifty years, had been carried on by them at the experimental farm at Rothamsted; and the medals were presented to them at Marlborough House by H.R.H. the Prince of Wales (now King Edward VII.), President of the Society, in the presence of many members of the Council. Like his collaborator, Sir John Lawes, he was an honorary or corresponding member of numerous home and foreign agricultural and scientific societies. On August 11th, 1893, that is, about a fortnight after the jubilee celebration at Rothamsted, Dr. Gilbert received the honour of knighthood.

The Jubilee of the Rothamsted Experimental Station in 1893 was made the occasion of a ceremonial which was of an unique and interesting character. At a meeting of the Royal Agricultural Society of England, presided over by H R H the Prince of Wales, it was resolved that, to mark the completion of half a century of continuous research in the Rothamsted station, some public recognition should be made of the invaluable services rendered to agriculture by Sir John Lawes and Dr. Gilbert. It was decided that the testimonial should take the form of (1) a granite memorial with a suitable inscription to be erected in the front of the laboratory at Harpenden; (2) illuminated addresses of congratulation; (3) a portrait of Sir John Lawes painted by Mr Hubert Herkomer, R A, and a massive silver salver to Dr Gilbert, bearing the following inscription: "Presented by the subscribers to the Rothamsted Jubilee Fund to Dr Joseph Henry Gilbert, F R S, in commemoration of the completion of fifty years of unremitting labour in the cause of Agricultural Science, July 29, 1893." The various presentations were made, and the commemorative granite boulder was formally dedicated at a meeting of the subscribers held at Harpenden on Saturday, July 29, 1893. The Right Hon. Herbert Gardner, M.P., President of the Board of Agriculture, presided, and there was a large attendance of leading agriculturists, scientists, and others.

The Lawes Agricultural Trust, established by the munificence of Sir John Lawes, provides that someone shall periodically visit the United States of America and give a series of lectures upon the results of the Rothamsted investigations. At the request of the committee of management, Sir J Henry Gilbert undertook this duty in 1893, and thus for the third time he visited the world beyond the Atlantic, his former visits having taken place in 1882 and 1884.

The results of the Rothamsted researches are embodied in print in many forms in the records of the Royal Agricultural Society, the British Association, the Chemical Society, the Royal Society, the Horticultural Society, the *Society of Arts Journal*, and the Dublin Royal Society, In articles in technical newspapers, and in numerous reports, pamphlets, and letters to the general press, too long for enumeration here, which, as regards the agricultural history, progress, and literature of the past sixty years are, we may confidently say, to be reckoned among the most remarkable achievements of the century,

He was twice married, first in 1850 to Miss Laurie, daughter of Dr. Laurie, who died in 1853: and afterwards in 1855, to Miss Smith, the present Lady Gilbert; he leaves no issue,

It is satisfactory to know that the researches at Rothamsted will be carried on in the future under the direction of the Lawes Trustees.

The funeral of the late Sir Henry Gilbert took place at Harpenden on Friday, December 27th, and was attended by the members of the Lawes Agricultural Trust Committee, and representatives of many of the scientific societies of the country. —*Gardeners' Chronicle.*

---

## COCONUT PLANTING IN THE NORTH-WESTERN PROVINCE.

### NEWS NOTES.

A Marawila correspondent writes :—The weather seems to have set fair. Save for a drizzly day on the 18th, we have had no rain since the 7th Jan. The mornings are very dewy and cold, with the temperature down to 74 deg. The afternoons are very hot with the temperature at 88 deg. The variation is not violent, yet fever, coughs and colds and dysentery are prevalent.

A little heat seems to have been evolved from the chronicling of record prices for nuts. By the time my communication appeared, the price I recorded had already been topped in several places. For the present, Kimbulapitiya heads the list. Since I took to planting in the low country, I had always heard dealers describe those as the best nuts in the Negombo district. Since then, systematic cultivation may have raised the quality of the nuts of other estates up to that standard, or even beyond it.

The present crops are better than the last crops of the last year, but they will not be available for some little time longer. Prices of nuts and copra are keeping up. The mills have been compelled to raise their prices gradually in order to attract grist to them.

There has been no confirmation to the rumour set afloat by a contemporary of yours, as to an early commencement being made with the Colombo-Puttalam railway. You must agitate for it, Sir, in and out of season. It is a crying want, with the advancement of the districts through which it will have to pass. It is a railway that will have to be opened in sections, and will pay from the start. As far as Chilaw, the route is thickly populated, and an over-flowing passenger traffic is assured. It is an ideal route for motor cars, and one would have thought it would have been the first to have been occupied by the Rapid Transit Company, as a precursor to the Railway. If the Government offer this Company liberal terms to occupy this route, valuable and reliable statistics will be available from its annual report of the passenger traffic a railway will attract at the start. At the start only—for passenger, like other traffic developes with the passage of time.

---

## FRUIT-GROWING IN CEYLON : MR. JOHN COTTON'S ORCHARD AT NUWARA ELIYA.

Visitors to Nuwara Eliya can do no better than spend idle moments by visiting the Orchard at Lake View where Mr Cotton with genial courtesy is only too pleased to show anybody round the sphere of his labors, where with much pride he now directs attention to an eating pear (Lecount) which after seven years' coaxing has just now one single fruit of a fairly decent size on one of its branches. With a recent importation of cherry plants from Australia, Mr Cotton has been very successful. One of the plants had been barely down six months when it flowered and came to fruit in splendid health. Mr Cotton watched its growth very attentively and was in hopes of picking a ripe cherry for the first time out in Ceylon, when some ruthless hand plucked the first before it had even a chance of getting thoroughly matured. Several apple trees which have been experimented on, and transplanted about the orchard in different soil and shade, have now got planted out to all appearances in their right places and are flushing beautifully and should get to fruit soon (as the plants are very much healthier than the plant so much fussed about at Frederics Ruhe here and expeeted to bear this year). The Red-heart Plum crop this year has not come on so well as it did last year when every tree in the orchard was laden with the fruit. But this deficit by way of income will be put on a par by the exceptionally large crop of the cooking pears on all the trees in the orchard.

A NEW METHOD OF PRUNING has evidently been tried by Mr. Cotton. The writer's attention was drawn to one particular tree which has several hundred fruits on it. The tree itself, Mr. Cotton is of opinion, is at least twenty-five years old and is really worth a peep at, just now. In a shady corner of the orchard, Mr, Cotton has an artificial dam where a constant water supply is let in and out of it. Here some trout are being very carefully matured with a view of getting the trout to spawn. Should the effort succeed Mr. Cotton will commence operation on a larger scale, and who knows that it will not in this direction, too, develop so, as to induce the Fishing Club to seriously make a similar attempt.

CLUB ROOT.—The cabbage disease is being fought against by Mr. Cotton with every possible experiment. Small success has crowned much untold labour. But the demon disease has not yet been laid low. That great success attend the new effort Mr. Cotton is about to make in this connection is the hearty wish of all vegetable growers in Nuwara Eliya.—*Cor.*

---

## DR. PATRICK MANSON ON MOSQUITOES AND MALARIA.

Dr Patrick Manson's lecture at the London Institution last night on the "Conveyance of Malaria by Mosquitoes" contained some interesting points and suggestions. It was now definitely known he said that malaria was none other than a parasite which lived in the red blood corpuscles of the human body and was carried about from victim to victim by mosquitoes. The success of the campaign against the evil would depend upon the intelligent co-operation of those whom it was intended to benefit. The necessities of the mosquitoes constituted the sanitarian's opportunities. Mosquitoes must lay their eggs in water, and in that element the larvæ could alone exist. The obvious course therefore was to render the water unsuitable which would be the radical method

of exterminating mosquitoes and consequently the diseases they carry. Already Dr Manson continued the practical application of such measures had borne good fruit. Since the English occupied Havana in 1762 that city had never been free in October from yellow fever and malaria. In October 1900 there were twenty-five deaths from malaria and seventy-four from yellow fever, but in October of this year thanks to protective measures, there were only nineteen deaths from malaria and none rom yellow fever.—*Daily Chronicle*, Dec. 13.

## PRODUCE AND PLANTING.

Sir Robert Giffen is an able man and a clever manipulator of figures. In some letters just contributed to the *Times* on the financial ontlook he makes some suggestions, one of which will certainly not delight tea planters. He begins by telling us that we should complacently make up onr minds that the national expenditure mnst in future always amonnt to £160,000,000. But Sir Robert sees that this extravagance would not be tolerated if it were borne by direct imposts, so he nrges the Chancellor of the Exchequer to ease direct and increase indirect taxation in a way snggestive of the devil take the hindmost. He would rednce the income-tax to 10d, and later on to 6d, and would make up the £20,000,000 lost to the Exchequer on account of this remission by imposing a tax of one shilling on the qnarter of grain, threepence additional on the ponnd of tea, a half-penny additional on sugar, one shilling per load of timber, one penny per gallon of petroleum, and an extra three shillings per barrel of beer. In this way the Chancellors of the future could revel in expense, inter alia, of the British-grown tea industry.

The *Times* commenting on Sir Robert Giffen's suggestions seems to approve them, for it says "There cau be little donbt that the tea would bear a charge of 2d or 3d per lb more, and sugar an extra half penny per lb." This looks anything bnt cheerful for the prospect of any rednction of the dnty on tea. The *Daily Telegraph*, on the other hand, says: "Two years ago, it may be in recollection, the duty on this product was raised from 4d to 6d per lb, and the result, pnt briefly, has been to cast the main bnrden of the increase upon the shoulders of the growers, whilst the public, for their part, have been paying for an inferior quality the price formerly asked for a better class of tea. On this snbject the views of a prominent teabroker may be quoted. 'It has been fonnd,' he stated, 'that the producer has paid the bulk of the additional duty—in fact, from 60 to 75 per cent in all. The public has shown itself averse to paying more for its tea than it did formerly, with the consequence that consumers have been content, for the most part, with an inferior variety, which brought abont the inevitable result that smaller crops of the finer qualities have been grown. In short, people now drink tea at 1s 6d the lb. that formerly cost not more than 1s 4d.' The average price (wholesale), this authority added, is 7½d to 8d per lb., which means that if the additional duty of 3d were imposed, tea, which is at present taxed to the extent of 80 per cent of its value, would be mnlcted to the amount of 100 per cent over and above its market price."

A return ordered to be prepared last autumn by the Honse of Commons of the various duties levied upon imports by the colonies and other possessions of the United Kingdom has just been issned by the Statistical Department of the Board of Trade. This retnrn presents a remarkably diversified tariff snch as is calculated to drive a customs reformer wild. The publication of the volume was not delayed long enongh to permit of the inclnsion of the new Australian Federal tariff. In the case of

TEA

the import duties are sufficiently perplexing in their variety. Thus in Canada tea is admitted free. In India there is a five per cent ad val duty; in Ceylon twenty-five cents per pound is charged; in New Zealand two-pence per pound; in South Africa six pence; while in the West Indies the duty ranges from eight pence to one shilling, or five per cent ad val. In British Guiana it is three pence per pound; in Mauritius it is eigthteen cents; in Fiji six pence; in New Guinea 2d per lb; while it is free in Hongkong, the Straits Settlement, and Malta. Under the new Commonwealth Tariff, not included in the return, the import duty on tea is 2d or 3d per lb and 20 per cent *ad val*

The Americans are proud of their

HOME-GROWN TEA,

and we have referred to the subject of their aspirations with regard to it frequently of late, because some rather wild rumours on the subject of its importance have been current. Dr. Charles U Shepard, one of the pioneers of the enterprise, is rightly accorded due praise for the part he has played during the last ten years in carrying on tea planting operations under difficulties. That there are unusual difficulties may be gathered from some particulars given in a recent nnmber of the New York journal, *Tea, Coffee, and Sugar*, which says, referring to the gardens which Dr. Shepard controls:—"These tea gardens in February 1899, endured conditions seldom experienced in the South, when the mercnry fell to two degrees below zero. The gardens had no protection from the weather, and it was feared they were ruined, but they have now entirely recovered. After the freeze the bushes were pruned liberally. Of course, this temporarily affected their productiveness." But the main point of interest to Indian and Ceylon growers is the prospect offered of tea growing becoming, in the United States, an important industry. On this point onr New York contemporary is interesting, but not alarming. We do not think Indian and Ceylon tea planters need feel any anxiety at present on the score that this American home-grown tea will interfere with the development of trade in British-grown teas in the United States.

A writer in the "Grocers' Review" says, in commenting on the

TEA TRADE:

"There is one point in which the trade seems to be undergoing a change, and in my opinion a change for the better. The grocer is willing to sell tea much smaller in leaf than formerly. As long as it is not 'dirty,' that is, laden with powdery dust, he seldom complains, however small in reason it is made. This is all to his advantage, as it enables the blender to use tea which would not otherwise assimilate in leaf, and allows a good proportion of thick, rich, broken tea, and manipulation by machinery leaves all the blend a uniform size. It is to be hoped that the day is not far distant when 'tip' and 'style' may be less valued by the average grocer than at present, as there is not one householder in a thonsand who regards these properties, if only the tea in the cnp is pleasing to the palate. In maintaining the trade in a healthy condition it is the cup that will tell."

In their monthly tea market report, just issued, Messrs Harrisons and Crosfield, of London, review the course of the

TEA TRADE

during the past year. The most noticeable feature, they say, is the restored feeling of hopefulness conseqnent on the re-adjnstment of the balance between demand and supply. In 1900 there was a surplus of 10½ million pounds, which, coming on the top of 3¾ millions surplus in 1899, depressed the market and caused the tea-producing industry to become unprofitable. Prices fell to an abnormally low point until March last, when it became known that some restriction

of production was in contemplation by the planters, coupled with a general endeavour to effect improvement in the quality. A more confident feeling then showed itself in the market, which has since steadily strengthened, the most marked rise being in the quotation for low-grade teas, which are now 1½d per pound higher than they were a year ago. The reduction in the quantities produced this season both in India and Ceylon has been almost entirely in the lower grades of tea, whilst the supply of medium grades in all growths has been very abundant, so that while there has been an important advance throughout the year in common kinds, medium descriptions have been in large supply, and consequently have sold at rates showing an excellent value to buyers.

Of the Toronto

TEA MARKET

the "Canadian Grocer" says: "The Indian tea season is over, and the shortage is confirmed at a high point. The situation locally continues to improve. As far as we can learn, there is nothing in Indian and Ceylon low grade teas under 12c. that can be considered merchantable. The local market is still below the parity of the London market. It is said the teas arriving are not costing less than about 13½c to 14c." —*H. & C. Mail*, Jan. 16.

In the last British Consular Report on the trade of Trans-Caucasus, the following occurs:—

The two principal growers of tea in the Trans-Caucasus—namely, the Imperial Domains and Messrs. Popoff, have, I am informed, added to the area under tea within the limits of their estates, but besides these two plantations hardly any other tea gardens of importance exist in the neighbourhood of Batoum, and, in my opinion, the reluctance with which holders of land have recourse to tea-growing, clearly demonstrates that the tea produced in this district is either not of the quality required to create a demand in the Russian market, or that the industry is still only in the experimental stage and the results hitherto obtained so uncertain that owners of small estates and the peasant classes prefer to wait and learn by the experience of others before embarking with any of their spare cash, in an undertaking remunerative qualities of which have not yet made themselves apparent.

The tea crop of the year 1901, although the largest ever obtained in the Caucasus, only amounted to 13½ tons, obtained after a period of over 10 years has elapsed since the first experiments in tea-growing were made in the district. It is clear that tea-planting in the Caucasus may at some remote period become sufficiently advantageous to warrant its being generally adopted.

Messrs. Popoff's estates are situated at three different points near Batoum—namely one at Chackva, the second at Salibauri and the third at Kaprshun. The area under cultivation on three estates is 312½ acres, of which 81 acres have been under tea for a period of over three years. The yield in 1900 was, I believe, nil, and in 1901, as far as I can ascertain, under 9,000 English lb. The crops on these estates, I am informed, are gathered on the Chinese system. The tea produced is stronger than the Chinese tea, none of it wasted.

RAMIE.

A most important branch of agriculture for the Trans-Caucasus would be the cultivation of the ramie plant which according to experiments made by the Imperial Domains authorities on their lands at Chackva, grows very successful on plots carefully selected for the purpose in view of the fact that the soil should not be of a marshy character and that it should be nourishing and porous. Besides the Imperial Domains several individuals have also started the cultivation of the 'Chinese nettle,' and have invariably obtained good results. Unfortunately manual labour is very expensive in this country, and this being the case it is quite out of the question to have recourse to stripping the fibre off the stalk by hand as is done in China, where labour is excessively cheap.—*London and China Express*, Jan. 10.

## PROFESSOR HERDMAN.

### HIS INTERESTING WORK ON THE WAY OUT.

Professor Herdman, the distinguished Liverpool naturalist who came out to Ceylon to undertake for the Government an investigation of the pearl oyster fisheries, writes to a friend who has sent the letter to the *Liverpool Daily Post*:—

SS. "Derbyshire," Gulf of Lyons, Jan. 1, 1902.

My dear Thompson,—I think I promised to send you an occasional note in case you and others of our Liverpool naturalists are interested to know how the scientific work goes on. There is little to tell as yet, but Mr Hornell and I have sent out 200 numbered drift bottles containing postcards, and we have taken daily gatherings of plankton from the sea.

You remember that one of our fishery questions is whether the young fishes of the Lancashire coast come from spawn produced north of Holyhead, between Anglesey and the Isle of Man, or south of that in Cardigan Bay—in other words, can floating fish spawn get round Holyhead into our district? We left the Mersey about midnight on Thursday, 26th, and at 1·30 a.m., when we were clear of the banks, I started throwing over the "drifters" in batches of ten every half-hour till we got to the middle of Cardigan Bay next forenoon. About 100 went over between the North-West Lightship and the South Stack, and another 100 south of Anglesey. The captain gave me the positions on the chart and I have sent the lists back to Mr Johnstone, so he will be able to make out the drift journeys when the postcards from the bottles are found, filled in, and returned to college.

They have kindly handed a bathroom completely over to me for the plankton work. I keep the key, and the sea-water tap runs night and day through my silk nets. The amount of plankton daily has been small as yet, but it is winter, and we had a gale in the Bay of Biscay, and the weather has been continuously chilly; so perhaps we have got as much as was to be expected. As soon as we got clear of the English Channel a few Atlantic organisms made their appearance, such as diphyes, pteropod shells, acanthometra, and other radiolaria. These continued down the coast of Portugal. When we got through the Straits of Gibraltar there was a complete change. All the larger animals disappeared, and their place was taken by minute diatoms (biddulphia and others) in such profusion as to block up the meshes of the fine silk. That continued for twenty-four hours, but we now seem to be getting through that area into, I hope, a more varied fauna. As you know, when the diatoms are abundant we generally catch very little else. I get the microscope out every morning after breakfast in the smoke-room, where there is very good light, and examine the night's catch. It is most interesting—quite apart from any use we make of them afterwards—to have these samples of the living organisms to examine every day from the seas through which we are passing.—Yours very truly, W. A. HERDMAN.

### PROFESSOR HERDMAN'S VOYAGE OUT.

Professor Herdman says that during the voyage out to Ceylon much valuable scientific work was accomplished on board, and both he and his assistant had their hands full all the way from Liverpool. In the Irish Sea experiments were made with the object of determining currents which carry the eggs of spawn. This was in connection with home fisheries, and altogether about 200 floating bottles were thrown overboard with instructions for their return to Professor Herdman by whoever should pick them up. All the way

out interesting tests were made with plankton, this being the scientific name for the myriads of microscopic floating life on the sea. This word is one which we owe to German analysis. By means of exceedingly fine silk nets—nets finer than those used by millers for precipitating the finest flour—the samples of sea water drawn each morning were made to give up their stock of floating life, and this was submitted to the closest scrutiny under the microscope. The Professor said that to the scientific mind the changes in the insect life as different seas were passed was remarkable, and from the scientific point of view the results of the experiments in the Red Sea eclipsed in interest the plankton elsewhere, according to our contemporary.

Dr Lyster Jamieson, M D, B Sc, London, whom Professor Herdman first expected to bring out as his assistant, was in Ceylon before and wrote a paper on Pearl Oysters.

## TEA IN PERSIA.

In commenting on Mr. Foley's report on the prospects of Indo-Persian trade via Nushki and Seistan, the *Pioneer* said a short time ago that the only question seemed to be as to whether the opportunity for exploiting a new market was likely to be seized. A correspondent now writes to that paper and says that the actual state of the tea demand in Eastern Persia was overestimated by Mr. Foley in his earlier letters that this has now been proved beyond a doubt, and that those who followed the advice of the advocates of sending caravans of tea to the Persians in preference to inducing the Persians to come to Quetta are likely to pay dearly for their venture. The writer then explains that the first large caravan sent from India was one consisting of 60,000 lb of Dehra Dun tea in charge of Mr. Ouseley, who reached Meshed some time ago. Messrs. Clementson and Marsh took charge of the next caravan, said to contain 40,000 lb of tea mostly from Southern India. This was followed by one from the Kangra Valley planters consisting of 30,000 lb under Mr. Greensill; and lastly another from Dehra Dun left Quetta in charge of Mr. Palmer at the beginning of November. It is probable that by means of camel caravans 200,000 lb of tea have recently been sent to Persia by the new route on the strength of Mr. Foley's early reports. The writer of the above letter continues that on his return from Persia, Mr. Foley, in an interview with an agent in charge of one of the above caravans, said he held out no hope of selling any tea at all between Quetta and Meshed, that probably at the latter place the market would be found to be overstocked, and that it was unlikely that remunerative prices would be obtainable there. He went so far as to recommend the agent to send his caravan on to Moscow. This certainly shows things in a different light, and nullifies the comment of our contemporary, that owing to lack of energy on the part of the Indian Tea Association it was only too probable that the existing trade in a favourite tea from Java, which finds its way to Meshed by caravan from Bundar Abbas will continue to expand.—*M. Mail.*

## COLOMBO AND TEA.

In his speech to the Central Travancore Planters' Association, the Hon'ble Mr. G L Acworth lays great stress on the Calcutta market as a source of relief in these congested times. He sincerely trusts that Calcutta will not starve their local market, and is confident that a good deal may be done in opening foreign markets by judiciously feeding that of Calcutta, and he considered that even more progress abroad might have been made had agents in the North fed their market more liberally. The Colombo market he regretted was still practically closed to Indian Planters, and he hoped that the time was not far distant, when "we and Ceylon shall interchange our products freely."—*M. Mail.*

## THE GREY PARTRIDGE OF CEYLON AND INDIA FOR NEW ZEALAND.

We had a visitor in Ceylon from New Zealand last month—Mr. Maddox of Wellington—who is interested in Acclimatisation and is anxious to see the grey partridge of Ceylon and India tried in his adopted land. The chief reason is that the English partridge, which has been introduced, gets killed out by hawks and that it is thought the grey partridges like the Francolins, would be better able to protect themselves. From the "Manual of the Game Birds of India" we quote as follows:—

### THE GREY PARTRIDGES.

The Grey Partridges are probably very closely allied to the Francolins, and as previously remarked Mr. Ogilvie Grant places them all in one genus. It seems to me, however, that the Indian Grey Partridges possess certain characteristics of coloration which render it desirable that they should be kept separate from the Francolins.

In the Grey Partridges the sexes are alike in coloration, but the males are much larger than the females. The tail is short and rounded and composed of fourteen feathers. The male has one or sometimes two spurs on each leg; the female rarely one.

These ePartridges may be recognised by the first ten quills of the wing being plain or unmarked, except that in one species the outer web of some of the inner quills, say the seventh to the tenth, has some small and insignificant mottlings at the base; by the tail being more or less rufous or chestnut; and by the upper plumage being cross-barred.

### THE GREY PARTRIDGE.

*Ortygornis pondicerianus*, (GMELIN).

Lower plumage cross-barred.

Sexes alike.

Vernacular Names:—*Titur*, *Ramtitur*, *Goratitur*, *Safed-titur*, Hind., general; *Khyr*, Bengali; *Gowjul-kuki*, Canarese; *Kondari*, Tamil; *Kuwunzu*, Telugu.

The range of the Grey Partridge extends over the whole of India as far east as the longitude of Calcutta; and it is also found in Ceylon. It does not, however, appear to be common north of the Ganges and Gogra rivers. This Partridge does not ascend the Himalayas to above a level of 1,500 feet, but occurs sparingly in the Nilgiris up to an altitude of 5,000 feet.

According to Messrs. Hume and Marshall, the Grey Partridge does not occur in the South Konkan nor on the Malabar Coast, and it is absent from the forest regions of the Central Provinces and their Feudatory States, and of the Tributary Mahals.

Westwards of India, this bird extends as far as Persia.

Dr. Jerdon has the following note on the habits of the Grey Partridge :—

"It frequents alike bush-jungle and cultivated lands, being often found in gardens and compounds, and very generally near villages, concealing itself in hedgerows and thickets. It associates in coveys of varied numbers, from five to fifteen, is often very difficult to flush, running for a great distance and with amazing speed, and taking refuge in thick bushes and hedges, whence it is driven with difficulty. When flushed it rises with a loud whirr, flies very strongly, but does not take long flights. It frequently perches on low trees and shrubs and on the branches of thick *Euphorbia* hedges. Its call is a peculiar loud shrill cry, and has, not inaptly, been compared to the word *Pateela-pateela-pateela* quickly repeated, but preceded by a single note uttered two or three times, each time with a higher intonation, till it gets, as it were, the keynote of its call."

The Grey Partridge appears to nest twice in the year, once from February to June, and again from September to November. The eggs are usually laid in a shallow depression, well concealed under a bush, or in a large tuft of high grass, and more or less neatly and thickly lined with grass. The eggs vary in number from six to nine, and are spotless, pale buff. They are oval, a good deal pointed towards one end, and glossy. They vary in length from 1·2 to 1·42 in length and from ·95 to 1·12 in breadth.

In this bird the forehead is chestnut and the crown umber-brown with darker shaft-streaks. A band over the eye and the cheeks is pale rufous. The chin and throat are buff surrounded by an interrupted black band or series of spots. The sides of the neck are delicately barred with black and white. The whole upper plumage, the visible parts of the closed wings, the tail-coverts and the middle tail-feathers are umber-brown, dashed with chestnut, especially on the back and wings, and everywhere barred with pale buff. The first ten quills of the wing are brown with a little grey mottling towards the base of the outer webs. The tail-feathers, except the middle pair are chestnut becoming black towards the extremity and tipped with buff. The whole lower plumage from the throat downwards is pale buff shaded with rufous closely and delicately but irregularly barred with black.

The male is larger than the female. Length of the former about 13 ; wing nearly 6 ; tail about 3½ ; length of the latter nearly 12 ; wing about 5½ ; tail about 3¼ ; legs bright red ; irides dark brown ; bill blackish. Weight up to 12 oz.

Mr. Maddox was on his way to Europe ; and left on the 31st January by the P & O ss. "Rome," so that he had time to make enquiries as to the best mode of procuring and forwarding to New Zealand, some pairs of our grey partridge, as an experiment. We should be glad to hear from any one able to aid in this interesting attempt at acclimatising.

## SIR ANDREW CLARKE ON TRINCOMALEE AND COALING PORTS.

I may introduce here what I wrote in 1883 about providing adequate defence for Trincomalee. "Having already stated the extreme importance that I attach to the retention of Trincomalee as a station for refitting and coaling H.M.'s ships, and as a base and rendezvous for our fleet, it appears desirable that I should very briefly indicate the nature of the defences which in my opinion are necessary to deny the harbour to an enemy's warships and to secure the naval establishment and anchorage from anything but distant bombardment. The entrance to this magnificent harbour is so narrow, the naval establishment so well protected by the natural features of the country, and so useful a nucleus of works of defence is already provided, that, fortunately, a comparatively small expenditure only is requisite to attain the above-mentioned objects. . . . . Under all the circumstances of the case it would, I think, be a sufficient measure of defence if the emplacements which were hastily and temporarily constructed in 1878-9 were carefully revised and adapted for the reception of 9-inch or 10 inch M.L. guns. The cost of these measures would be about £25,000, for the works and £20,000 for the armament."

Naval authorities had not then grasped the importance of coaling stations. On their safety the power of the Navy depends, and to protect them is a cheap mode of adding to the naval strength of the Empire. Their provision in sufficient numbers and at well-chosen spots on the great ocean routes to India, Australia, and China is the first essential need for the maintenance of our naval position in the East. There is no necessity to establish too many coaling stations ; indeed to do so would be to introduce an element of weakness into our position by offering the enemy more objective points of attack than it would suit our arrangements to adequately defend. I would specify the following as meeting all possible requirements of the present and the immediate future :—Aden, Bombay, Trincomalee, False Point, Port Blair, Singapore, Thursday Island, Hong-Kong, and Port Hamilton.

A second line of coaling stations between the Cape and India on the one side and Australia on the other will ultimately become necessary, but probably the Seychelles in one direction and the Cocos in the other will suffice for all our requirements, especially after South Africa has been provided with several harbours of refuge.

Of these, Aden, Bombay, Trincomalee, Singapore, and Hong Kong are either completely or nearly equipped to meet all requirements as coaling stations and naval harbours. False Point for the Hooghli could easily be converted into a harbour of refuge by clearing out the river mud from the Mahanadi. A coal depot at Port Blair in the Andamans would be very useful, as supplementing Trincomalee, and as providing a set-off against any possible Dutch-German development in Achin. Thursday Island in Torres Straits has been looked after by Australia, and will become more and more the first care of her naval directors. Port Hamilton, once ours, and which gave England practically the command of the seas of China and Japan, has now unfortunately been lost to us. [But should be occupied immediately Russia takes any portion of Corea.]

Where the coaling station is used exclusively for providing coal and supplies to our ships, there the charge and responsibility should be entirely Imperial. But when the coaling station is attached to a colony that would itself be the immediate object and reward for temporary, if not permanent, occupation by an enemy, there the charge and responsibility should largely, if not wholly, devolve on the colony itself. The case of Trincomalee

comes under the former category, that of Thursday Island under the latter, while Singapore may be cited as an instance where the Imperial and colonial interests are about equal. However these stations may be protected, and from whatever source, Imperial or colonial or joint, the necessary funds may come, we have to recollect before everything that coal—ubiquitous coal—is as the breath of life to our naval power and activity.

## MALARIAL INSECT TRACKED.

### A DISCOVERY OF VAST IMPORTANCE TO COLONISATION.

It is now stated, on the authority of Sir Alfred Jones, who is so well known for other public services that many people may forget that he is chairman of the Liverpool School of Tropical Medicine, that a new cause of malarial fever has been discovered. It is well known that Major Ronald Ross has attributed a good deal of the malaria which is the curse of the West Coast of Africa—and many other coasts—to the bite of malarial mosquitoes. And now Major Ross is able to announce that Dr. Dutton, who is one of his assistants, has made the important discovery that there is yet another parasite which brings fever to the unhappy white man on the West Coast. It is said to be like the insect which causes "fly disease" among horses in South Africa, and, if so, the discovery will be of twofold importance. On the news being submitted to a medical expert on tropical disease, a somewhat chilling reception was given to it. This gentleman said that it might be true, but that he preferred to wait before expressing an opinion. But of one thing he was quite certain—if the cause of malarial fever in man or of fly disease in cattle had been found, then it was one of the most beneficent of the discoveries of the age. The reason why the discovery would be of such importance is that it would make possible the colonisation of vast regions of the British Empire which are now the white man's grave—*Daily Mail*, Jan. 10.

## RUBBER SUPPLIES IN 1901.

(*Messrs. Figgis & Co.'s Annual Review.*—)

London, January 3rd, 1902.

We have to report fewer fluctuations in prices during 1901 than previous years, but at the close all rubber is cheaper than a year ago. Fine Para 3d., negrohead barely ½d, but Cametas 2d. Peruvian ball and slab about 1d per lb.

The supply of all medium rubber has fallen off considerably and nearly the whole of the old stock has been disposed of at very low prices; resulting in great losses to holders as has been the case with many fresh imports. Our stocks of these kinds are now greatly reduced and we look for an improvement in values shortly and should encourage imports.

The year has shown a continued increase of demand for the finer rubbers at relatively high prices, and the European consumption of fine Para considerably exceeds any previous year. English manufacturers have been very busy. Continental fairly so. American were less occupied till the last three months. On the whole the year has been a very active one.

The Continental stocks are very much reduced, but America holds fair stocks of Para:—

Visible supply now of Para and Peruvian 4,618 tons against 4,100 tons last year (including America 2,005 tons against 1,200 tons).

There is a further increase from Brazil—about 3,200 tons from the Amazons (including Peruvian *via* Iquitos and Manaos, 4,000 tons against 3,100 tons). The Peruvian fine has been better as a whole, but should be cut and selected before shipment. The ball has been fair and some nice hard clean brown lots realised very high prices; weaks labby and dirty sells cheaply. The slab was good. Of Bolivian we received less, but probably as much was produced and quality was satisfactory. Of Molendo increased supplies during the latter months of the year; quality good. From Venezuela *via* Orinoco the supply was less and rather poor quality. Ceara more but only good clean wanted. Manicoba—Fair supply of improved quality. Pernambuco and Assare was in fair supply and realised much lower prices. The Mangabeira supply declined enormously; very good clean sold well, common at a great decline. Mattogrosso has rather increased; some parcels were rather dirty and badly prepared.

From Central America the supply has been considerably declined, and again owing to war only small lots from Colombia; these Ecuador, Tumaco, Guayaquill sell readily and scrap only 1d lower than a year ago: inferior and mixed much cheaper. Some from the Cauca, Magdalena sold fairly, also Nicaragua and Gautemala.

Of Honduras Mexico and Panama very small lots.

African shows a serious falling off probably 1,500 tons—Angola 250 less; say Benguela 1,250 tons against 1,550 tons in 1900. Loanda 730 tons against 678 tons (besides 200 tons Thimbles). Quality has been hardly so good. The Congo has slightly increased but the quality has seriously declined; about 5,300 tons against 5,000 tons in 1900. The average price shows a very considerable decline because so much was poor quality. Quite an extraordinary decline in supply of Gold Coast, Accra, Lagos, etc., and only moderate from Cameroons, Sierra Leone, Gaboon, etc., and small of Senegal. Prices of nice hard only about 2d lower, but soft common and Lagos fully 4d decline for the year.—*India Rubber Trades' Journal.*

## CEYLON RUBBER.

Messrs. S Figgis & Co. have the following in their latest Report:—"Of Ceylon small lots sold at high prices. We again urge planters to give attention to this valuable product. Ceylon is much liked and sells readily. We obtained 3s 9¾d recently for fine and 2s 4½d for negrohead grown from Para seed."

THE SUGAR CROP OF HAWAII FOR 1901—has exceeded the most liberal estimates, having been 360,000 tons. Fine harvesting weather and an increased supply of water for irrigation from artesian sources, have been the chief factors in producing this result. Under like conditions, the next crop will be fully as large. The largest production of refined sugar in the United States for any single year was that of 1899, which was 1,773,870 tons. The production of 1900 was 1,566,038 tons. It is estimated by those in the trade best qualified to judge that the American Sugar Refining Company produced about eighty per cent of the output in each of those years.—*Hawaiian Planters' Monthly*, Dec. 15.

## PLANTING IN KALUTARA DISTRICT.

(*From the Annual Report of the Kalutara P.A.*)

CROP ESTIMATE.

| | Total acreage. | Acreage in bearing. | Black tea lb. | Green tea lb. | Total lb. |
|---|---|---|---|---|---|
| 1902 | 16,843 | 15,541 | 6,970,763 | 546,000 | 7,516,763 |
| 1901 | 16,711 | 15,501 | 6,775,000 | 225,000 | 7,000,000 |
| Increase | 132 | 40 | 195,763 | 321,000 | 516,725 |

The actual crop for 1900 was 7,088,610; for 1901 6,655,025
The estimated crop for 1900 was 7,037,700 ; for 1901 7,000,000

Increase 50,910 decrease 344,975

The total crop for 1901 was less than that for 1900 by 433,585 lb. This district, like all other tea districts, has been seriously affected by the low prices its teas were fetching during the greater part of the year. By finer plucking, however, and making a better class of tea, the prices have raised, though the amount of tea made is considerably reduced, and now the teas from many estates in the district command as good prices as those from some up-country estates. It is hoped that Planters will not be tempted by the higher prices paid for low-grade teas to go in again for coarse plucking, a proceeding which must result in bringing about a similar depression in tea interests to that which ruled a few months ago, with probably more serious consequences.

PARA RUBBER.

In this, the parent district in the Island, as far as this species of the rubber-producing tree is concerned, considerable attention has been bestowed on its cultivation during the last few years. Though there is no large acreage, probably not more than 150 acres in the whole District, planted with rubber only, on most estates more or less has been planted along the ravines and other suitable places through the tea, and there are now many thousands of trees of various ages, amounting in the aggregate to a very considerable acreage.

TAPPING.—Previous to last year tapping was practically in the experimental stage, but in 1901 quite an appreciable quantity, close on 3½ tons, of rubber has been shipped to London and found a ready market at from 3d—5d per lb. more than any other rubber on the market at the same time. One lot of half a ton, which was sold early in the year, realized 4s 1¾d per lb. and the buyer expressed his readiness to take 20 tons at the same price.

SEED.—The foreign demand for seed, which was very considerable not very long ago, is practically over, but a very brisk demand has sprung up quite recently in the Island, and most of the estates which supply seed have their visible supply of both seed and plants fully booked already for the coming season.

EXPORT.—The increase in production for the next few years will be slow, as but few estates had much rubber planted prior to 1897. In 1906 the output of the district should be at least 50 tons, worth over £15,000. A very appreaciable addition to the revenue of the district.

## PLANTING IN RANGALA DISTRICT.

TEA.—The tea industry has passed through the most trying period in the whole history of this product, and with the closing months of the year prospects have brightened considerably. The unfavourable weather for growth and the producers' endeavours to curtail production by a system of finer plucking have had the desired effect of reducing the output from both India and Ceylon and as the world's consumption continues to expand the position may be considered stronger than at the commencement of the past year. It is to be hoped that the producer may not be tempted by a temporary enhancement of price to flood the markets with inferior teas. Your Committee are pleased to observe no indication of such a course in this district, the official estimate of crops for 1902 being slightly lower than the revised estimate of 1901.

CARDAMOMS.—The area in cultivation has not been extended to any extent, and crop was on the whole about the same as for the previous year.

TELEGRAPH.—It is with pleasure we can record the construction of the Telegraph to Teldeniya, which will be at the service of the public in January.—*Rangala P.A. Report.*

## PLANTING NOTES.

TEA grows wild on all the hills round Chiengmai and there is a large local consumption of the leaf not as a beverage but as a quid for chewing and eating. The leaf is picked in April, August, and November. After being picked it is at once steamed, and if it is to be kept for any length of time, either packed in bamboos or wrapped in a special kind of leaf and buried to exclude the air. Before using, a few grains of salt are wrapped inside the leaf, and the quid is complete.—*Indian Planter's Gazette.*

ACCLIMATISATION IN NEW ZEALAND.—Mr. Maddox, who left for England by the P.&O. ss. "Rome" on the 31st ult. and returns to Wellington *via* America, has not been successful while here in seeing one of our grey partridges save in the Museum. He is afraid now, from what he hears of its running rather than flushing propensity, that it will not suit for the sportsmen of New Zealand. The two great successes so far have been in the introduction of red deer and of trout. New Zealand is going to draw anglers from all parts of the world to its trout fishing. Ordinary trout up to 27 lb. and "rainbow trout"—the best in the world for fly-fishing —of 7 lb. are available in streams and lakes amidst some of the finest scenery in the world.

LAST YEAR'S PATENTS.—The number of patents applied for in this country during 1901 was 26,766, including applications from abroad. This number compares as follows with previous years :—

| | | | |
|---|---|---|---|
| 1891 ... | 22,878 | 1896 ... | 30,193 |
| 1892 ... | 24,179 | 1897 ... | 30,952 |
| 1893 ... | 25,107 | 1898 ... | 27,650 |
| 1894 ... | 25,386 | 1899 ... | 25,800 |
| 1895 ... | 25,062 | 1900 ... | 23,922 |

The actual patents granted are usually about half the number applied for, owing to applicants abandoning their applications at the end of the term of provisional protection. An increase in the patents connected with improvements in electric traction is beginning to be noticeable, and this undoubtedly is the most interesting feature of the applications made last year.—*B. & C. Druggist,* Jan. 10.

# Correspondence.

## *To the Editor.*

## CEYLON TEA ON THE CONTINENT AND MR. RENTON'S VOTE FOR 1902.

FRENCH CUSTOMS DUTIES ON TEA.

Havre, Dec. 20th, 1901.

DEAR SIR,—I hope there is yet time to protest against any increase in the vote to Mr Renton for 1902. He tells us that his expenditure for 1901 will be £6,500. If you deduct from that his salary, £1,000, and another £500 for the bonus on importations of tea into France, there still remains the important sum of £5,000 to be accounted for. Is nobody going to ask how this money has been spent? The great feature of his campaign this year, I speak, of course, of France alone, has been the travelling show through the towns of Northern France for the purpose of distributing tea in the cup, gratis, "degustation"—as it is called. I know he has spoken of other projects; he has told us of tea being now sold in the absinthe bars of Paris. I don't know what he means by "Absinthe Bars." I have lived a good many years in France and never heard of such places. Anyhow I hope he has not devoted any large portion of the £5,000 to subsidising such establishments, if they do exist, for it would be a great waste of money. It may be, from a humanitarian point of view, a very laudable thing to try and convert the drinkers of this murderous and deleterious decoction to the use of tea as a substitute, but it is not business, and you will never found the prosperity of your tea trade in France upon such a basis. No, the great triumph of Mr Renton in France this year has been the "degustation.' Show. It is *the* feather in his cap—the great hit of the season. He dwells complacently on the immense success that has attended it everywhere. The populations flock to it in crowds and it is evident he intends, in process of time, if he only gets money enough, to make tea drinkers of them all. I hope, therefore, your readers will bear with me for a few moments while I discuss this degustation business. The show is realy only one man going about from town to town and making arrangements with a grocer or two in each place to allow the demonstration and distribution of tea in his shop. I have seen something of it as it passed through Havre. A rough crowd gathered in front of the shop where the degustation took place, interrupting the traffic on the footpath. The crowd was what you might suppose, a crowd of riff-raff, mostly of odoriferous and verminiferous riff-raff. Here is Mr Renton's own description of such a gathering: "In one place the people collected in a perfect throng, each bringing some sort of household vessel, from a bed-room ewer down to an empty case, in which to carry away the tea they expected to be presented with." Does Mr Renton really suppose that because these people have got a cup of tea for nothing they are going to become regular consumers of Ceylon tea? You might as well think that they would in future drink nothing but Château Lafitte because some silly wine merchant gave them a glass of that exquisite vintage.

The *clientèle* that you have to get at are the people who go in for five o'clock tea, the ladies of the upper classes. Now I ask any reasonable man, are ladies likely to be attracted by a squalid exhibition of this kind? Does Mr. Renton want us to believe that a lady could be induced to join in this mob of rag-tag-and-bobtail and drink from a half rinsed cup that had previously been in the hands, and approached the lips, of a dozen of the great unwashed? Psha! The whole grotesque masquerade is absurd and the money expended upon it, is money thrown away. Mr. Renton himself admits that the depots where these degustations have taken place do not sell much tea, "may not sell" is his way of putting it, but that apparently is only a secondary consideration for him. So long as "the demonstration goes on right merrily" he is perfectly satisfied and he is cocksure of knocking China tea out of France. We shall see. I observe that the gentleman who organised this show for Mr Renton has written to protest against the reduction of the grant and to say that he expects to receive another £500 or £600 for next year. It is a good thing to be in the graces of the Commissioner. How long is this to continue? Mr Renton seems to plead for five years. I hope you will bring your powerful influence to bear to put a stop to such reckless extravagance.

On the question of the future customs duties on tea in France, Mr Renton appears to be very much at sea. In his letter of 23rd October to Mr Rosling, he says :—

"I much regret that there seems every possibility of the law which comes into force on the 24th February doubling the duty of tea being allowed to take affect; if it does, the result will be a disastrous blow to our campaign in France. The Central American States have been able to arrange treaties by which their products will have the benefit of the most favoured nation clause, and, therefore, a large quantity of coffee will continue to come in at the minimum tariff. I cannot understand why the benefits of the most favoured nation clause which England possesses should not be extended to the English Colonies, but our Ambassador here says he can offer the French authorities no *quid pro quo* to induce them to extend the benefits of the clause to the British Colonies. Last year he pooh-poohed the idea of a new law coming into force, this year he rubs his hands and says he can do nothing. I shall make a final desperate appeal, through the Colonial Office, when I go to London, but the outlook is distinctly bad."

That is to say that he gives up Sir Edmund Monson as hopeless and that he is going to stir them up at the Colonial Office in the hope, I suppose, that Mr Chamberlain, with the tact and amenity which characterise his references to foreign nations, will find therein an opportunity of telling the French to mend their manners, or rather—on this occasion—to mend their customs.

I may here remark, parenthetically, that Mr Renton never saw the Ambassador, so that when he tells us of what His Excellency said and of what he did in the way of pooh-poohing and rubbing his hands, he is only drawing upon his imagination.

In another letter, dated Calais, 27th October, which appeared in the *Observer*, Mr Renton recommends Ceylon people to threaten to put a pro-

hibitive duty on French champagne. I say nothing of the total absence of discretion and good taste in speaking in such terms of our respected Ambassador, nor of threatening reprisals to a friendly nation. This is all part and parcel of the new diplomacy. I will only remark that a few days after these pessimistic views were expressed I was able to inform you, upon the best authority, that the French Government were about to give us entire satisfaction and that a bill was in preparation for continuing the duty as at present existing.

I wonder if the incongruity of the situation ever strikes the Ceylon Public. Here we have a gentleman drawing a large salary, accredited to all the important British Embassies abroad, who calls himself the Ceylon Commissioner in Europe, a title to which he has no right whatever, who ought to know everything and who knows nothing; who tells us it is as good as settled that the tea duty is going to be doubled in France on 24th February next, and that it is all up with our trade, and it is left to me, a private individual who does not even enjoy the barren satisfaction of receiving a courteous acknowledgment from the "Thirty Committee" or anybody else, for the service he rendered in exposing the favouritism and extravagance of the management in Paris last year, it is left to me, I say, to inform the public that these doleful forebodings are groundless, and that no alteration is going to be made in the duty on Tea in France next year.—Yours faithfully, J. J MARCEL.

## CEYLON GREEN TEAS IN CANADA.

Toronto, Dec. 28.

DEAR SIRS,—We read Mr. Rosling's letter to the Ceylon Association in London with very much interest, especially the figures showing the rapid increase in the production of Ceylon *green* tea. We, the "Salada" Tea Co., have been enthusiastic about these teas. They were first introduced to our notice by Mr. Mackenzie in 1898, in which year, we notice by Mr. Rosling's figures that there were 13,302 lb. shipped, all of which came to ourselves. In 1899, 86,327 lb. were shipped, practically all of this, over eighty thousand pounds came, also to us. Unfortunately our sales are not keeping up in proportion to the output of green tea, but they are enormously increasing and we are as enthusiastic today about these teas as we were some years ago, and we will always look with pride to the fact that we were the first to recognise their merits and to put them before the public.

Wishing you the compliments of the season,—we are, yours truly,

P. C. LARKIN & CO.

## SALT IN AGRICULTURE.

DEAR SIR,—I remember reading in the *Observer*, and afterwards in that invaluable compilation the *Tropical Agriculturist*, which I have been filing from No. I, that the husk of the Coconut is rich in Salt and Potash. It was, of course, after burning the husk that the constituents were registered by Mr. Cochran. Can you or any of our great Manure Merchants or their Analysts tell me, whether the Salt and Potash are latent in the husk and so may be evolved by decay, or whether the agency of fire is necessary to secure these important soil constituents? I have seen great heaps of coir dust, obtained from the husk, lying idle, and have been told they have no manurial value. If mere burial of the coir dust will not secure salt and potash from it, why is it not burnt, if the ashes have a high manurial value?—Yours truly,

IGNORAMUS.

[We shall deal with this subject later on.—ED. *T.A*,]

## RUBBER IN SABARAGAMUWA.

SIR,—With reference to this Government advertisement, it would be interesting to ascertain who the lessee is and what he paid, it being a public property?

MERCHANT.

Tenders will be received up to noon of December 31, 1901, by the Government Agent, Province of Sabaragamuwa, at his office at Ratnapura, for the right to lease for the period of twelve months, renewable at the end of each year for a further period of twelve months, if conditions stated below are observed, of the Government rubber plantation, situated at Edangoda, near the 12th milepost on the cart road from Ratnapura to Nambapana, in the valley of the Kalu-ganga. The plantation is 27 acres in extent planted with Havea rubber, aged from 9 to 11 years, and containing 2,800 trees. The lessee will be bound to keep the said plantation free from jungle growth or encroachment. The lessee will be entitled to collect latex or seed, but in doing so should any rubber tree be killed, he will be liable to a fine of R10 for each rubber tree so killed or damaged beyond recovery, That no rubber tree shall be felled or uprooted without the special consent of the Assistant Conservator of Forests, who shall at all times be at liberty to inspect the said plantation.

[A question should be put in the Legislative Council.—ED. *T.A*.]

## PLANTING IN ZANZIBAR.

Friends' Industrial Mission, Pemba, Zanzibar,
1st January, 1902.

DEAR SIRS,—I am greatly interested in *The Tropical Agriculturist*, and find it very useful. But the seasons in Ceylon are evidently quite different from here in the Southern hemisphere. Ginger and other things are, in "All about spices" and other papers, recomended to be planted in March and April. I have tried it and it does not do at all. I have now planted Ginger, Arrowroot, &c., in October and November, and find that a much better time.

I am sending you some Meteorological Observations which I have taken here, thinking they may be of interest, as no one else has taken a continuous record in this island.

The clove crop both in Zanzibar and Pemba has been small this year, but I am glad to say that on this plantation we have had the best crop on record as far as I am able to discover. After about five years' experience I can say that *free paid* labour

answers infinitely better than slave labour or any kind of forced or contract labour. We have now about 200 free labourers on the plantation. Since obtaining their freedom they have greatly increased both in bodily and mental power. They have not become idle, insolent or thievish since becoming free as was so confidently predicted.

As far as I can see, the system of contracting with freed slaves to work three days per week for the Arab or other planter in lieu of rent of such land as he likes to cultivate on the other four days is a failure.

We have recently planted out 300 rubber trees (Hevea brasiliensis) which are doing remarkably well. Over 1,C0) young coconut palms have been planted out, but the white-ants destroyed large numbers of them. Can you recommend any thing to prevent the ravages of this pest?—Yours faithfully,
THEODORE BURTT*.

Just as I finished writing, a neighbouring missionary planter called; he tells me he recently planted over 50 coconut palms and the white-ants have destroyed 40 of them already. T. B.

---

* PLANTING IN ZANZIBAR.—The letter of Mr. Theodore Burtt is full of charm to all interested in Industrial Missions and who desire to know how their neighbours in other lands are progressing. The labour question is present in Zanzibar, but appears to have been successfully solved by Mr. Burtt who advocates "free paid" labour. Special interest will be attached to this efforts (albeit on a small scale) in this quarter to cultivate rubber trees and coconut palms. The former appears to do well, but the latter have succumbed to the destructive incursions of white ants. Mr. Burtt wants a preventative against these ravages: has he referred to our "Coconut Planters' Manual" where several remedies or rather preventatives are given: here is one of the simplest:—

Forest or old chenas are not generally infested with white ants, but land that has been for any considerable time either completely or partially open is full of them; they are not partial to dry coconut husks, but they attack with great avidity such as are attached to young plants, and have been buried from six to nine months in the soil. When a young plant is transplanted, it requires a greater or less time, according to the weather, to throw out fresh roots into the surrounding soil, and is in the meantime supported and nourished by the husk. If, however, those insects take a fancy to it, they devour the husk in a few hours, and the plant inevitably perishes. The best way to deal with such land is to put down plants already two or three years old, but if it be necessary to plant seedlings, to dissolve eight quarts of salt in a tub of water, thicken with fresh cow-dung, cover the husks with a coating of the mixture and let it dry before planting.

A perusal of the meteorological observations shews an ample and fairly well distributed rainfall. We are gratified at Mr. Burtt's appreciation of our *Tropical Agriculturist* and glad to know he finds it useful.

METEOROLOGICAL OBSERVATIONS TAKEN AT BANANI, ISLAND OF PEMBA, EAST AFRICA.

| 1901. | Mean Max. | Mean Min. | Absolute Max. | Absolute Min. | Rainy Days. | Rainfall. |
|---|---|---|---|---|---|---|
| January | 84·56 | 73·80 | 90·0 | 70·0 | 13 | 4·00 |
| February | 82·50 | 71·90 | 85·0 | 68·0 | 13 | 12·09 |
| March | 85·80 | 74·23 | 90 5 | 72·5 | 12 | 6·54 |
| April | 81·90 | 70·62 | 87·0 | 70·0 | 23 | 20·79 |
| May | 80 22 | 70·05 | 84·0 | 68·0 | 25 | 27·40 |
| June | 78·90 | 58·10 | 83·0 | 66·0 | 16 | 3·23 |
| July | 78·46 | 67·10 | 80·0 | 66·0 | 14 | 3·06 |
| August | 79·16 | 67·26 | 82·0 | 66·0 | 11 | ·93 |
| Sept. | 80·53 | 67·38 | 83·0 | 65·0 | 5 | ·90 |
| October | 83 18 | 69 50 | 86·0 | 67·0 | 8 | 2·73 |
| Nov. | 82·93 | 71·48 | 87·0 | 70·0 | 13 | 7·50 |
| Dec. | 83·50 | 73·00 | 87·0 | 71·0 | 13 | 3·61 |
| Year | 81·80 | 70·37 | 90·5 | 65·0 | 166 | 92·78 |

Highest temperature in the sun 175°.

| Years. | | | | | | Inches |
|---|---|---|---|---|---|---|
| 1899 | 83·03 | 70 02 | 92·0 | 65·0 | 149 | 105·24 |
| 1900 | 83 05 | 71·03 | 95·0 | 66·0 | 160 | 90·35 |
| 1901 | 81 03 | 70·37 | 90·5 | 65·0 | 166 | 92·78 |

THEODORE BURTT.

---

## TEA PLANTERS BEWARE!
## A LESSON FROM WINEGROWERS.

London, Jan. 5.

DEAR SIR,—The present position of "Tea" is not very dissimilar to that which obtained in the early months of 1899 and which tempted so many estates to go in for "quantity." It is sincerely to be hoped that the mistakes of the past three years will not be repeated. To judge by enclosed cutting from last night's *Globe*, tea growers have not been the only ones to fall into the fatal error of thinking that the market for common stuff cannot be over-loaded.—Yours truly,
TEA MERCHANT.

The extract is as follows:—

THE FRENCH WINE CRISIS.

The crisis in the French vineyards of the south is acknowledged to be really serious, and the cause of it is generally considered to be over-production. But there is another thing to be taken into account, and that is the abandonment of other crops for wine growing. Of late years immense energy has been shown among the wine growers of Southern France, and new and improved methods of culture have been introduced. But not content with forcing the products of their vineyards, the proprietors have, in too many instances, taken land which was formerly used for cereals or pasture and have turned it into vineyards. Old fashioned growers warned the innovators that they were going too fast, and that more than sufficient wine would be produced without planting any more vineyards, but their protests were not listened to. The result has been an enormous production of inferior wine, many of the brands having nothing wine-like about them except their colour. At first the wholesale wine merchants bought largely, but as soon as they found that they were buying stuff which would become undrinkable when the hot weather began, they only offered absurdly low prices, and merely bought enough to fill their orders. To compensate for the poor prices the wine growers produced still more wine, and so the vicious circle

continues. Only those who were satisfied with producing a small quantity of good quality have kept up their prices.

---

## IMPORTANT FIGURES IN TEA.

London, 10th Jan., 1902.

Dear Sir,—The Board of Trade Returns for the United Kingdom during 1901, are commented on in most of the brokers' circulars which will reach you by this London mail of 10th January :—

| | | | |
|---|---|---|---|
| Tea imports | 1899 | 289 | millions. |
| | 1900 | 300 | do increase 11 mill. |
| | 1901 | 297 | do decrease 3 do on 1900 nett and increase 8 millions in 2 years. |
| Home Consumption | 1899 | 242½ | millions. |
| | 1900 | 249¾ | do increase 7 mill. |
| | 1901 | 255¾ | do do 6 do or 13 mill. in 2 years. |
| Exports | 1899 | 32 | millions. |
| | 1900 | 43 | do |
| | 1901 | 43¾ | do |
| Stocks in bonded Warehouses | 1899 | 113 | millions. |
| | 1900 | 119 | do |
| | 1901 | 116 | do |
| Imports : China | 1899 | 35 | millions. |
| | 900 | 21 | do decrease 14 mill. |
| | 901 | 20 | do do 15 do in 2 years. |
| Imports : Indian | 1899 | 143 | millions. |
| | 1900 | 155 | do increase 12 mill. |
| | 1901 | 161 | do do 6 do or 18 mill. in 2 years. |
| Imports : Ceylon | 1899 | 101 | millions. |
| | 1900 | 114 | do increase 13 mill. |
| | 1901 | 105 | do decrease 9 do nett increase 4 mill. in 2 years. |
| Home Consumption of China | 1899 | 16 | millions. |
| | 1900 | 13 | do decrease 3 mill. |
| | 1901 | 10 | do do 3 do or 6 mill. in 2 years. |
| Home Consumption of India | 1899 | 134 | millions. |
| | 1900 | 138 | do increase 4 mill. |
| | 1901 | 148 | do do 10 do or 14 mill. in 2 years. |
| Home Consumption of Ceylon | 1899 | 85 | millions. |
| | 1900 | 92 | do increase 7 mill. |
| | 1901 | 91 | do decrease 1 do nett increase 6 mill. in 2 years. |
| Re-exports : China | 1899 | 11 | millions. |
| | 1900 | 18 | do increase 7 mill. |
| | 1901 | 11 | do decrease 7 do or nett nothing. |
| Re-exports : Indian | 1899 | 8 | millions. |
| | 1900 | 10 | do increase 2 mill. |
| | 1901 | 13 | do do 3 do or 5 mill. in 2 years. |
| Re-exports : Ceylon | 1899 | 12 | millions. |
| | 1900 | 14 | do increase 2 mill. |
| | 1901 | 18 | do do 4 do or 6 in 2 years. |

The Customs Duties yielded to the Chancellor of the Exchequer:—

| | | | | |
|---|---|---|---|---|
| 1899 | .. | Sterling | £4 | millions. |
| 1900 | .. | do | £5½ | do. |
| 1901 | .. | do | £6½ | do. |

There is much that might be remarked on the above figures. The increase of India's tea from 143 millions to 161 millions in two years might be commented on in a cynical spirit in connection with their proposed restriction of output.—Yours truly,

MERCHANT.

## CEYLON TEA SALES IN LONDON.

13 Rood Lane, London, E.C., Jan. 10.

Dear Sir,—Regarding the cutting which you enclose from one of your contemporaries, we think the correspondent "Puzzled" would perhaps have shown more courtesy if he had written direct to us instead of writing to one of the newspapers. However, we cannot, of course, control the actions of your contemporaries' correspondents.

The headings given to the grades of tea he mentioned, viz:—"Pekoe Souchong—rather bold leaf, indifferent liquor. Pekoe—somewhat bold leaf, indifferent liquor" are meant to imply that they are the lowest classes of the respective grades which Ceylon is in the habit of sending, and it does not always happen that these are represented in each week's sale, and indeed, prices of such teas would not be published in our circular unless they were sold on garden account, as in that circular we do not give the prices of Colombo bought teas As a matter of fact, the week after the one in which your correspondent writes, there were several parcels of Pekoe Souchong sold at and under the price we quoted, and had they happened to have been catalogued in the week in question we have no doubt that the price would have been correspondingly low, and had there also been pekoes of a similar character, these would also doubtless have sold under our quotation ; had we then given the quotation as anything higher, any one wishing to criticise, without going fully into the case, might have written that our quotations were too high instead of too low. You will thus see the difficulty of pleasing everybody in these matters, and we can only do our best to hit the happy medium which is certainly not always an easy thing to do.—We are, dear sirs, yours faithfully,

GOW, WILSON AND STANTON.

---

## OFFICIAL RUBBER-PLANTING IN BURMA: ANOTHER PROTEST.

Selangor, Federated Malay States, Jan. 13.

Dear Sir,—I send you herewith a printed copy of a Memorial which the United Planters' Association of the F. M. States have sent to the Right Hon. Joseph Chamberlain in support of a Memorial which has already been sent to him by the Ceylon Planters' Association, and trust that it will be of interest to you.—I am, dear sir, yours faithfully,

E. B. SKINNER

Hon. Sec., U P A, F M S.

[We quote from the Memorial as follows :—

That your Memorialists desire to bring under your consideration the intention of the Government of India to plant up 10,000 acres in the Mergui Division of Burmah with the Para Rubber tree (*Hevea Braziliensis*). That, whilst it is stated by the Revenue Secretary to the Government of Burmah that this proposed scheme on the part of the Government of India is in the nature of an "experimental measure," your Memorialists desire to point out that the acreage referred to is at least equal to, if not in excess of, the whole area planted by private enterprise in the Federated Malay States, and the Straits Settlements.

That for the last five years the cultivation of Para Rubber has been progressing steadily in this country, and promises in the near future to be the

main agricultural staple. Owing to the continued depression of the coffee market, the Liberian Coffee Estates of this Peninsula have been almost without exception planted up with Para Rubber, in the same way that Cinchona and Tea were planted, with such successful results to that Colony, on the Coffee Estates in Ceylon; at the same time, a considerable area of virgin forest has also been brought under cultivation with this product in the Federated Malay States.

That in the Botanical Gardens of Ceylon and the Malay Peninsula, Para Rubber trees, of a sufficiently mature age, exist in sufficient numbers to render it apparently unnecessary for the institution of an experimental garden of anything like the dimensions as that which forms the subject of this memorial. That your Memorialists directly contribute to the revenue of the Federated Malay States, by paying an *ad valorem* export duty of 2½ per cent. on all agricultural products, in addition to payment of rents and premiums for land; that further, in certain cases, special arrangements have been made with the Government whereby it is incumbent upon land owners to plant up the whole of their concessions with rubber within a period of ten years. That your Memorialists submit that the production of so large an amount of Para Rubber by the Government of India must result in serious competition with private growers, who have, under already existing circumstances, to contend against an enormous supply from the indigenous rubbers of other countries.
—ED. *T.A.*]

## TEA MACHINERY PATENTS: "WANTED TO KNOW."

SIR,—How long have Mr. Jackson's patents yet to run? Is not the time limit 14 years unless it be proved that the patentee has not received adequate remuneration, which could hardly be said in the case of Mr. Jackson's Rollers? For instance, at present a Rapid Roller cost £160 f.o.b. Contrast the metal and work in a roller with an elaborate machine such as an oil engine of, say, 10 horse-power, at about the same price. Surely, the time limit must be near at hand, for Down draft Siroccos, Rapid Rollers, Venetian and Britannia dryers? If memory serves me right, I possessed a Down-draft Sirocco in 1888 and also a Rapid Roller!

PRO BONO PUBLICO.

[We met a gentleman the other day who said he put in Abbotsford (old) Factory, the first of Jackson's Dryers introduced into Ceylon?—What strikes us about our correspondent's query is that Jackson's is not the only Tea Roller; are any others much cheaper?—ED. *T.A.*]

## "THE INDIAN AND EASTERN ENGINEER."

Calcutta, Jan. 16.

DEAR SIR,—We are sending you herewith a copy of our January special issue which deals particularly with the Jamalpur Locomotive works of the East Indian Railway.—Yours truly,

THE EDITOR.

[We have received the periodical referred to above and have been particularly struck with the enterprise displayed by the publishers in the production of the magazine. Printed on fine art paper, it is profusely illustrated, many of the pictures being full-page engravings excellently brought out. The special contribution of the month's issue deals with the Jamalpur Locomotive works of the East Indian Railway. The article is well written, and the many illustrations give one an ample idea of the magnitude of the workshops of this Eastern Railway. Of very special interest is a half-page illustration showing a substantial number of men—"Jamalpur's Representatives in South Africa'—who formed a maxim gun detachment with "Lumsden's Horse" in the earlier stages of the Transvaal war. The advertisements, too, we notice, are displayed in a perfectly artistic and up-to-date manner. We congratulate the publishers on thus keeping abreast of the times.—ED. *T.A.*]

## TEA MACHINERY AND PATENTS.

Jan. 22.

DEAR SIR,—I see by your foot note to my letter published in your issue of 16th January that you think that I am invidious in singling out Mr. Jackson and Messrs. Davidson's patents. This is not so; all I wish to do is to ascertain *if* these or *other* tea machinery patents *have lapsed.* If so, the same machine could be turned out by local firms at probably a saving of nearly 50 per cent and yet give a handsome profit *to the manufacturer* and place the machines within the means of many a planter who, like myself, is sore-pressed for capital and the necessary machinery to cope with increased crops but starvation prices. It is commonly reported that Mr. Jackson's royalty is nearer £100 than £50 on each full sized Rapid Roller.—Yours faithfully, dear sir,

PRO BONO PUBLICO.

[We have heard a rumour that both Messrs. Jackson and Brown's patents have had a period added to them, to make up for the time spent in litigation.—ED. *T.A.*]

## PEARL OYSTERS OFF CROW ISLAND. TRINCOMALEE.

Harbour Road, Trincomalee, Jan 26th.

DEAR SIR,—I send you part of an oyster, and the smallest pearl, out of two, found in one of them. These oysters, of various sizes, have lately drifted in abundance on the shores of "Crow Island" opposite the late "Crawford Cutch Company Mills." I believe them to be from some disturbed beds driven by the tide during the recent heavy rains and the overflowing of the Mahaweliganga, or from some of the numerous bays outside and within the harbour. The pearl oysters at Kinniyai Bay are large oval ones, and glossy throughout the outside when polished, like the internal layers, but these are quite unlike them. Professor Herdman might do well to experiment on our coast.—Yours faithfully,

J. B. COLOMB.

[It is certainly Professor Herdman's intention to visit Trincomalee and that very soon too. We shall have pleasure in sending him the shell forwarded by our correspondent—a small thin one—doubtless of *Placona placenta*?—and the pearl, a little beauty.—ED. *T.A.*]

## STENNING, INSKIPP & CO'S INDIAN & CEYLON TEA MARKET REVIEW FOR 1901.

### CEYLON.

The market opened with a stock of nearly 7,000,000 lb. in excess of the previous year and prices consequently ruled low; Pekoe Souchongs were in full supply at 3¾d per lb, compared with 6½d per lb. in January, 1900, and by the middle of February had further declined, sales being made at 3d per lb—the lowest price on record. By June, common grades began to advance, Pekoe Souchongs making 3¾d to 4d per lb. During August and Sept. seven sales were held by private auction, containing 24,743 packages; after this they were discontinued. All good liquoring teas were in demand throughout the year, and the market closed with a firm tone, fair Pekoe Souchongs selling at 5¾d to 6d per lb. Taking it all round, quality showed improvement and the absence of coarse tea was noticeable. Some of the gardens in the higher districts sent invoices with good flavour, and these were well competed for both by home buyers and exporters.

Foreign Trade.—It is satisfactory to note that the export from this country to the Continent is steadily increasing, notwithstanding the larger direct shipments from Colombo.

### INDIAN.

Lane, Jan. 1902.

The Market opened in January with nearly 70,000,000 lbs. stock, a large proportion of which was common and undesirable. Pekoe Souchongs sold down to 3¾d per lb., or about on a level with the closing prices of 1900. Fine and finest were in small supply and were readily taken at fair prices. During the early part of February common grades still further gave way, while all good teas were sought after at full value. The heavy duty payments made about this time much occupied buyers and withdrawals from sales were numerous. As the month advanced, the market steadied and all good liquoring teas were in demand at improved quotations. A few fine Darjeelings sold well; on the other hand, very low averages were made for poor quality Sylhets, Cachars and Dooars. During March and April all good liquoring teas met a quick demand at satisfactory rates, but a large proportion of the offerings was of extremely poor quality, and prices fell to the lowest on record. When it became known on the 18th April that no alteration would be made in the Duty, the market became quiet and remained so till the season closed. The new season began on the 1st June with an excess stock of 12,680,000 lb., the figures being 38,890,000 lb., compared with 26,210,000 lb., in 1900. This heavy supply, coupled with the fact that a very large amount of tea cleared in anticipation of the Budget had not passed into consumption, told against the early arrivals of the new crop, the opening prices for which were very moderate. By July all good liquoring teas met a ready sale, especially Assams, and some satisfactory averages were made; old season's common grades also slightly improved in value. During September a trial was made of selling by private auction, but after six sales had been held, at which 41,812 packages were offered, the experiment was discontinued. Common grades began to harden, while on the other hand, all good medium tea declined, the quantity of such being rather in excess of the demand. In October buying became more general and some slight improvement in value was noticeable for medium grades about 6½d to 7d. In November it was decided to regulate the weekly supply at auction; during this month and December quotations remained steady, the large falling-off in the exports from India and the consequent reduction in stock having brought about a firmer tendency on the part of Importers. The year closed with a better tone for all grades, ordinary Pekoe Souchong being worth 5¾d per lb, against 3¾d at the opening sales of 1901, about ½d per lb of this difference being attributable to improvement in quality.

With a few exceptions it is to be feared that at the best only moderate dividends can be looked for as the result of the season's working, the general average price being not much in advance of that of the previous year; while owing to climatic conditions and greater care in the plucking, the yield of leaf has fallen decidedly short. Looking to the future it is to be hoped there will be no reverting to coarse plucking consequent on the improved prices compared with last year. now ruling for the lower classes, It must be borne in mind that the increase from the additional area which will be coming into bearing will undoubtedly again lead to overstocked markets and unremunerative prices if this policy be resorted to. Growers both in India and Ceylon, now that they have secured so much of the world's demand, should use every endeavour to retain their customers by maintaining a satisfactory standard of quality for their produce. The stock at the close of the year was rather in excess of that in 1900, but this is accounted for by the increased facilities for despatch from some of the districts. A very encouraging feature is the expansion in the deliveries which during the twelve months amounted to almost 13,000,000 lbs, of which home consumption accounts for 10,000,000 lbs and this in spite of the increase in duty.

The NEW REGULATIONS regarding the weighing of tea are now in force, viz. :—

1. If the package weighs the even pound, it is to be entered as such.

2. If it weighs the even half pound or over, it is to be entered as the next pound above.

3. If it weighs below the half pound, it is to be entered as the pound below.

Loss in Weight.—As this occasionally gives rise to much dissatisfaction we offer the following suggestions: that the gross weight of the package should be a few ounces, say four or five, *above* an even number of pounds, and that the empty package, complete with lead, nails, bands, &c., be to a like extent *below* an even number of pounds. In weighing here the gross weight is *reduced* to the even number of pounds, whilst the tare is *increased* to an even number of pounds

With regard to Garden Bulked Teas, it is imperatively necessary to put an equal quantity into each package of the break, and this quan-

tity should be four or five ounces over the desired weight of contents, viz., if the packages are invoiced to contain 100 lb. tea each, not less than 100 lb. 4 oz. should be weighed in; test packages, weighing here a fraction under 100 lb., are reckoned as 99 lb only, or a loss of 1 lb on each chest of the break.

Careful observance of the foregoing precautions will prevent loss and disappointment.

Draft of 1 lb. per package on all packages grossing 29 lb. and upwards is allowed to the buyer.

Weight of Packages.—When a gross weight of 129 lb is exceeded, there is an additional charge of 4d per package up to 159 lb. The following sale of charges fully explains this and deserves attention:—

Dock and Warehouse management rates, on packages of which the average gross of each break is as under, are:—

| lb. | lb. | lb. | lb. |
|---|---|---|---|
| 160 to 199 | 130 to 159 | 90 to 129 | 80 to 89 |
| 2s 2d | 1s 10d | 1s 6d | 1s 4d |
| lb. | lb. | lb. | lb. |
| 60 to 79 | 45 to 59 | 35 to 44 | 17 to 34 |
| 1s 2d | 11d | 10d | 6d |

The above charges do not include Rent or Bulking (where necessary).

Marks on Chest.—Nothing is wanted or is of any service here beyond (1st.), Garden Mark; (2nd.), Description of Tea; (3rd.)), Garden Numbers. Gross, tare and net, are not of the least use, and should be discontinued.

## MATALE PLANTERS' ASSOCIATION.

Tea.—Referring to the figures collected at the beginning of last year we have the following totals:—

Acreage in tea 20,313 acres; acreage in bearing 18,152 acres; estimated crop, 7,882,000 lb., In collecting figures for 1902, the Honorary Secretary got out a new form, collecting details of the three principal products of the district, and these were very well responded to, both by members of the Association and non-members, to whom thanks are due. The writer had to estimate crops, and returns, for only about five estates out of about eighty odd to which circulars were sent. The difference in acreage and estimates for 1901 between the figures now compiled and those of the beginning of the year is due to the fact that a few estates have since been excluded as not actually within the district. We now have:—Total acreage in Tea 19,566 acres; Total acreage in bearing 17,345 acres; Reported abandoned, 1901, 407 acres; Opened in 1901, 71 acres; Original estimate 1901 7,561,500 lb. Tea; Crop secured 7,252,140 lb. Tea; Estimates for 1902, 7,613,215 lb. tea. Above figures were collected from 79 estates. The crop secured in 1901 works out at 418 lb. made tea per acre, and it must be admitted that the crop realised comes exceedingly near the amount estimated, which would seem to show that there was not much alteration in the plucking throughout the district as a whole, though the Elkaduwa district estates are reported to have gone in for somewhat finer plucking during the year. The estimated yield for 1902 shows an increase, but this may easily be due to an increase in the bearing acreage, as the figures show about 2,000 acres, roughly still to come into bearing. A fair amount of manuring seems to be going on throughout the district, but probably more with a view to keep up yield rather than increase it. This particularly applies to estates in the bottom of the valley opened in chena land. On the whole the district is holding its own in yield, whilst during the last six months very fair prices have been realised, and the outlook for 1902 is fairly good. Still we must not forget that we have gone through a severe crisis, and there may yet be another and a worse one in store for which it behoves us to be prepared.

Cacao.—The exports during the past year have been the largest on record, an increase to which this district has contributed its portion. As little new land is coming into bearing it may be assumed that this means an improvement in the agricultural position of the product, and that Canker and other pests are being successfully combatted. Speaking generally, the cacao estates in this district are in a flourishing condition, and there is every prospect of a continuance of good crops. Spraying of the pods and trees has been carried out on a few estates with beneficial results. The statistical position of cacao generally is sound, consumption is increasing, and the stocks are lower than they have been for some years, but the market for Ceylon has been disorganised, and cacao is hard of sale. This is probably to be accounted for by the mixed character of the cacao now exported. Lots of pure red cacao without a mixture of dark beans are now very rare, and will become rarer still as Forestero takes the place of the red. Lots of unmixed red cacao will always command exceptional prices, but the future of the enterprise depends on Forestero, and planters must in future be content with such prices as good. West Indian commands, with which growth Ceylon will probably in future sell. Theft of cacao has occupied much attention during the last year, and the Association has succeeded in establishing the fact that as regards this evil the district is in an exceptionally bad condition. Acting on our advice the Government Agent and his Assistant have lately interested themselves in the suppression of this crime through the village headmen and police. The result has been fairly satisfactory, and theft has decreased, owing partly no doubt, to the improved supervision of the headmen, and their being compelled to interest themselves in the suppression of theft in their districts. The year, however, has been an unfavourable one for judging of the effect of the efforts of the officials mentioned, as cacao has been hard of sale, and the thieving industry has therefore naturally languished. We, however, give every credit that may be claimed for the improved state of things. We presume the Government Agent and his Assistant have done their best, and we are therefore now in a position to point out where the law fails. As it stands at present, to secure a conviction, eye-witnesses of the actual theft are necessary. This means that a man may be seen leaving an estate with a bag of stolen cacao in his possession, but unless he has been seen actually picking the pods he goes free. A store may be broken into and the cacao stolen may be found in a receiver's boutique a quarter-of-a-mile off an hour afterwards, but unless an eye-witness can be produced to the theft, and to the delivery of the cacao to the receiver, no prosecution can be carried out with a hope of success; the cacao is lost to its local owner, and the receiver can sell it openly. Under such circumstances the wonder is not so much that theft exists, as that we succeed in keeping it at all in hand. Special outbreaks of crime are met by special legislation all the world over, and in the coffee days in Ceylon, Government did not shrink from such a course. The position of things now as regards cacao is very similar, and in our opinion special legislation is urgently required.

Rural Police were condemned as useless by this Association last year. This year another trial has been given to them close to the town of Matale where they receive very close personal supervision from the Assistant Government Agent and the headmen are compelled to work with them. Under these circumstances the police are a success; but this fact in no way affects the utility of such a force in outlying parts of the district

where such provision is an impossibility. We further wish to point out that rural police are an expense to Government and to the planters, and that we believe that by special legislation crime could be suppressed without any expense to either. Per figures collected—Acreage under cacao in Matale districts 9,627 acres; acreage in bearing, 7,922 acres; crop secured in 1901, 14,026 cwt; crop estimated for 1902, 15,506 cwt.; acreage opened in 1901, 194 acres. Above figures include 400 acres estimated native gardens. Yield per acre 1¾ cwt. Figures collected from 52 estates.

CARDAMOMS.—The total area in Ceylon under this product cannot be under 7,000 acres of which fully one-sixth is in the Matale district. During the early part of the year crops are so very short that it was generally supposed the total export would be under that of last year, but the shipments in December, about 120,000 lb. being far in excess of any previous months' shipment, ran up the figures to 559,704 lb. or 32,249 lb. in excess of the previous year. With favourable weather during the present year the crop will in all probability be close on 600,000 lb. As this spice is but little known in the continental and European markets, every opportunity should be seized by growers for sending samples to exhibitions of Colonial products. Per figures collected:—Acreage under cardamoms, Matale district, 1,515 acres, acreage in bearing, 1,013 acres; crop in 1901, 77,408 lb.; estimated crop in 1902, 96,100 lb.; acreage opened in 1901, 141 acres. Yield per acre 76 lb. Figures collected from 23 estates.

RUBBER.—In writing of rubber in Ceylon we include the three varieties, Ceara, Para, and Castilloa. As regards the first, "the old Ceara" as it is generally called, there is little to be said. Ceara rubber grows like a weed almost anywhere in Matale and seems to thrive where little else can get enough out of the soil to even exist. Unfortunately the market value of the rubber collected from this tree is so low that it is scarcely worth tapping. From the small amount of tapping which has been done it is very evident that a tree growing on the banks of a river gives Rubber in much larger quantities and much more freely than another tree of the same age and size planted back from the river banks.

CASTILLOA RUBBER.—This tree appears to grow well here in fairly good soil and does not seem to depend so much on the rainfall as the Para tree. We have trees on this estate said to be about 12 years old and these were tapped by Mr. Gordon Reeves about two years ago and he has supplied the following figures:—Tapping for 6 months, from October to March inclusive, 6 trees gave 11 lb. to 12 lb. of Rubber, nearly 2 lb per tree. Mr. Reeves thinks that with more careful tapping and curing the yield might be brought up to nearly 2½ lb. per tree, though he doubts if the trees would give more than that amount if tapped twice during the year. The latex from these trees runs much more freely than that of the Para trees, hence the cost of production should be much less. The trees here began to bear seed at 8 to 9 years old, but seed has been picked from a tree only about 9 ft. high and not more than 4 years old; there were only about 4 cones containing 8 or 9 seed each, but this does not make the fact of so young a tree bearing seed at all, any the less remarkable. Mr Willis of Peradeniya states that Castilloa trees do not bear seed in any quantity unless planted in a grove of eight or ten trees together and my own experiences bears this out. This seemed to point to the trees being male and female, but on writing Mr Willis, he says that male and female flowers both grow on the same tree and must be pollinated. This is now done by insects and a large percentage of the flowers always fall off. Enquiries are to be made as to whether it cannot be done by hand, and if this is possible a very large crop of seed could be obtained. There is a clearing of 42 acres of Castilloa Rubber planted 15 by 15 ft. between cacao lines on Ambanganga estate in Matale North where both rubber and cacao are doing exceedingly well; the soil is good though inclined to be "irony," but the rainfall is very low. In planting Castilloa, basket plants should be used and the basket put low in the hole, so that the earth level may come 2 or even 2½ inches up the stem of the plant. The reason for this is that though the plant is an exceptionally hardy one, if one gets dry weather after planting, it is apt to die down to the earth level, and then if planted as I suggest the stem below the earth level will send up new shoots.

Castilloa is probably the Rubber for Matale District.

(Signed) H STOREY,
Hon Secretary.

The report was adopted.

---

## PLANTING NOTES.

THE BANANA seem much to the front at the present day, and comes in for a good deal of laudation; the banana plant, says M de Lovedo in El de Progress Mexico, will feed 150 men from the product of one hectare of land so planted, while the same area in wheat would only supply food for six individuals, for the same space and under similar conditions of cultivation, its produce is 40 times that of potatoes and 100 times that of wheat. The fruit of the banana contains 72 per cent of water, 2·14 per cent of nitrogenous matter, and 22 per cent of saccharine substances, the latter giving it its great nutritive quality.—*Hawaiian Planters' Monthly.*

THE PROTEST against the increased Tea Duty from the Secretaries of the India and Ceylon Tea Associations appears in the London *Times* of January 11th, received by the French mail, and is as follows:—

### THE TAX ON TEA.

TO THE EDITOR OF THE "TIMES."

Sir,—In your leading article of this morning on Sir Robert Giffen's financial programme you say that "there can be little doubt that tea would bear a charge of 2d or 3d per pound more."

We wish to state that the whole subject of the tea duty and its incidence was fully dealt with last year in a memorial from our association to the chancellor of the Exchequer.

The Chancellor, in his Budget speech on April 15 last, said:—

"I turn to tea. Tea has already been taxed up to 75 per cent of its value. It is produced mainly in India and Ceylon, and it is a product in which our fellow-subjects at home and abroad are deeply interested, and the trade in which, I think, largely owing to over-production, is not in a very satisfactory condition. I do not think we ought to increase the duty on tea."

Again, on June 18, in a speech on the Finance Bill, he said:—

"If it should ever be his happy lot to be able to reduce taxation, he should be disposed to reduce the duty on tea rather than on beer or spirits."

Your present proposal to increase the duty by 25 to 40 per cent on the value has hardly, we think, received due consideration.

We are, Sir, your obedient servants,

ERNEST TYE, Secretary, Indian Tea Association.
WM. MARTIN LEAKE, Secretary, Ceylon Assocation in London.

14, St Mary Axe, E.C., Jan. 10.

## IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES :

### HINTS FOR SCHOOL GARDENS.

This is the second Primer issued by the Government Department; the first was drawn up by Mr Watts and called "Nature Teaching." The present pamphlet is intended for the use of the Village School Teacher, and from it he can set his pupils to work in the garden allotted to the school, or if space is too limited, he is to start the children, using flower-pots and old packing cases or portions of kerosine tins, for "box and pot cultivation." Full directions follow as to preparation of soil, the sowing of seed, and care of seedlings. The next chapter is on the garden—the laying out, preparation of the soil, seed-beds, raising seedlings, thinning and transplanting, care of plants and propagation by layering. Chapter III. is devoted to the subject of manuring—compost heaps and manuring experiments, but in no case to theories. It is all for the practical work of a garden and any school teacher with this guide in hand could give a valuable series of lessons to school children in their allotted gardening hours, thus implanting a taste for making vegetable or fruit gardens around their own homes. Every direction is delightfully clear and complete. Mr. W. G. Freeman, Mr Morris's Technical Assistant, is the writer of the pamphlet.

---

## INDIAN TEA CROP :—1902, THE NEED OF CAREFUL "PLUCKING.",

*(Circular.)*

To all Members of the Association.

DEAR SIRS,—I am directed by my Committee to send you a copy of the following resolution which was passed unanimously at a meeting held this day :—

"That this Committee, viewing with grave concern the disastrous results that would follow a large crop of tea in 1902, would strongly urge upon producers the necessity of restricting outturn as much as possible by a system of more careful plucking or otherwise, and to avoid more especially the production of coarse tea which did so much harm to the industry in season 1900."

The above resolution having been unanimously accepted by my Committee, I am desired to give you their reasons for the conclusions arrived at, which are shortly as follows :—

In their opinion the experience of the past two seasons has conclusively proved—

(a) That the coarse plucking resorted to in 1901 resulting in a plethora of common undesirable tea being forced on an already over-supplied market, led to a lower level of prices than has hitherto been known. Pekoe souchongs were sold as low as 3½d, a price which must have been well under the cost of production.

(b) That, per contra, the more careful plucking resorted to in 1901, combined with climatic influences, restricted the output to such moderate limits that the market immediately responded, thus showing that the price of tea is controlled by supply, which control is entirely in the hands of the growers themselves.

Messrs. Thomas Cumberlege & Moss, in their Circular of the 3rd inst., make the following statement :—

"Of the 187,000,000lb. and 145,000,000lb. respectively produced in India and Ceylon during season 1900-1901, the last 12,000,000 lb. from the former country and the last 8,000,000 lb. from the latter were at a moderate estimate the actual cause of an aggregate loss to Importers of over £1,000,000 sterling; this, on the face of it, is an absurd situation, and it is not to be doubted that by individual or collective action some means will be found to prevent its recurrence."

It is, therefore, abundantly clear that it would be a disastrous policy to revert to the system of coarse plucking resorted to in 1900. It would mean that the end of 1902 would see the industry again in a position of great depression equal to, or worse than that at the end of 1900.

The position of Indian tea has not, for some years, been as strong as it is now, and this is owing to the certainty of a shortage as compared with the 1900 crop of from 10 to 12 million pounds. The shortages from Ceylon, China and Japan, also of considerable extent, further tend to strengthen the Indian position, and it is with the object of warning those who are directly connected with the industry that my Committee think it desirable that every member should carefully consider the position in framing his estimates for the coming season. One Indian Company whose estimates for the coming season were placed at 5,000,000 lbs has cut them down to 4,400,000 lb. and if this policy is adopted by all producers the result will be a far-reaching benefit to all concerned.

With a falling-off of at least 10 million lb in supplies of Indian tea during the coming season, with home deliveries here increasing in the same proportion as they have done during the past twelve months, and with the natural increase of demand from abroad, it is obvious that Importers have now an opportunity such as they may not have again for years of putting the industry once more on a sound and profitable basis.

An appeal to the same effect as the above is being issued by the Committee of the Ceylon Association to all Ceylon tea growers. Seeing how loyally these responded to a similar appeal in the past season, and seeing the direct and tangible benefit that both Ceylon and India derived therefrom it is confidently anticipated that the Growers in both countries will again loyally respond and so remove the reproach that tea planters are incapable of concerted action for the common weal.—Yours faithfully, ERNEST TYE, Secretary.

14, St. Mary Axe, E.C., 7th January, 1902.

---

## WHEN COFFEE IS GOOD.

There are various ways of making coffee, and many places for the consumption of it. Few, it will be admitted can really make good coffee, but very often coffee but indifferently made may taste like nectar. Take for example the time when one is almost completely overcome with thirst, or when one is particularly hungry. Then coffee is at its best. The following "poem" is from *Planting Opinion* :—

The man wot keeps a early coffee-stall
  And sells good stuff, and always is perlite.
Is wot I call the neighbour of us all,
  And well I know the truth of wot I write.

You 'aven't got no baccy, and the dawn,
  Though late is 'ardly showing up at all.
W'y all your bloomin' pleasures would be gawn
  If 'twasn't for the early coffee stall.

And 'im wot keeps it—wot a lot 'eknows
  From them as do not get it second 'and!
Wot nice illumination, 'ints 'e throws
On little things you could not understand!

A egg, a cup of coffee, and a slice,
  A chat which i'm w'en things is goin' slow :
My brother, take and 'ark to my advice—
  These are as good as aught that you may know.

I talk impartial, as a family man,
  That do not walk nocturnal now at all ;
Find me a chap more useful if you can
  Than 'im as keeps a early coffee-stall.

## THE FUTURE OF THE PLANTING INDUSTRY IN INDIA :

### POSSIBILITIES OF SUGAR.

#### SPEECH BY MR. COX.

A dinner was given lately at the Station Club, Muzaffarpur, by the Planters' Association. Over sixty were present. Sir William Hudson proposed the toast of the King. Mr Macnaghten gave that of Sir John Woodburn, who, he said, as Lieut.-Governor had shown an active interest and a keen insight into the requirements of the Planters excelled by none of his predecessors. His Honour, in replying, referred to the support always given to Government by the Planters which was not forgotten now that an opportunity offered for reciprocating their past services. Their position was serious. It was essential to relax no effort to place the industry in a sounder position. He appealed to the young men especially to take a keener interest in experimental work. While he was pleased to note the gallantry and buoyancy they displayed, joined with a spirit of indomitable courage, it was necessary to exercise prudence and circumspection if success were to be achieved.

Sir William Hudson proposed the health of the guests coupling with the toast the name of Mr C S Cox, who responded as follows:—

Your Honour, Mr. Chairman and Gentlemen,—While there are several present here who probably could more fitly be put in a position in which I find myself, I am not sorry to have the opportunity, which is being given me, to refer to a matter about which something has already been said tonight.

#### THE ATTRACTION OF CAPITAL.

This question of the sugar industry in Behar was first brought to our notice by Sir William Hudson and his brother, mainly no doubt because it was known that we had for sometime previously been interesting ourselves in the matter of the Currency Policy of the Government of India, and on that account might reasonably be expected to be prepared to enquire into any promising industrial development. It was thought by many that when India went on a gold basis, that fact in itself would be sufficient to attract capital to the country, but we found in practice that while stability of exchange is essential on many grounds, that alone is not sufficient to attract capital for investment here. I may remind you of the cases, for instance, of the Argentine and the Brazils, which continue to attract capital in spite of a fluctuating exchange. The real reason for this is that big profits have been made in the London market in connection with these countries, while no one of this generation has made profit in the London market over India. The great enterprises in India, railway, &c., have been controlled by Government, which does not allow large profits. Possibly money has been made locally in the manufacture of tea and jute, but these have had no effect on, nor have they tempted London. This is shown by the fact that there is no Indian market on the Stock Exchange in London as anyone may at once discover who has a suggestion about India business to make to a London stock-broking firm, and we had realised, before I met Sir William Hudson, that it was absolutely essential that something should be found and actively followed up, which appeared to afford a reasonable chance of making a practical demonstration to English financial circles of the opportunity vouched for by the Currency Committee in July, 1899, before India had any chance of attracting English capital.

The Committee reported among other things that "the natural resources of India are beyond question, as also is the need for their development. In order to develop and reap the benefit of her resources, India requires, and must long continue to require, foreign capital. We desire to record our opinion that the effective establishment of a gold standard is of paramount importance to the material interest of India. Not only will stability of exchange with the great commercial countries of the world tend to promote her existing trade, but also there is every reason to anticipate that with the growth of confidence in a stable exchange, capital will be encouraged to flow freely into India for the further development of her great internal resources."

In another clause speaking in January, 1899, Lord Elgin said :—"India has most of the advantages which are calculated to inspire the capitalist with confidence." But these mere expressions of opinion, however influential, don't attract capital.

#### THE INTERESTS OF THE PLANTER.

Without knowing anything practically about sugar, I at once grasped the possibility of such an industry in India, if the figures and facts supplied to me, on investigation, proved to be reasonably correct. I was favourably placed for checking the figures given me about Queensland and other countries—I came to the conclusion that there was a reasonable probability that Sir William Hudson had not over-stated his case, and we sent out an expert to report on the correctness of the local conditions, as they had been represented.

At this stage in our progress we were not a little encouraged by His Honour's Government appointing a Commission to investigate the whole subject, in the interests of the Behar planting community. While we had made considerable progress previous to this announcement, the form in which the instructions to the Commission were given by the Bengal Government, emphasised the interests of the planters in the matter, and having a predisposition, in regard to our whole scheme for the promotion of the industrial development of India, to act on the line of the least resistance with the said Government, and the Government of India we, from the start had it very much in our minds, that the interests of planters in the matter should receive every consideration. The more I have looked into it and become acquainted with the local conditions, the more I have been convinced that everything in the direction of promoting that planters' interests has been equally the promotion of our own.

Sir William Hudson at an early stage of our intercourse made this point strongly to me, and it is due to this gentleman and to his brother that, I should state, not only in regard to this point but of all other facts and figures put before me, over two years ago, that they have been borne out by our recent experience and experiments. I have myself felt the greatest interest in this aspect of the case, for as a planter in Ceylon I had experience of the coffee crisis in 1880-82, a crisis in many respects very similar to that now being experienced here, and I trust that planters will benefit from that experience.

SUGAR AND INDIGO.

The coffee planter of 1880 was proud of his coffee and looked down upon tea. The indigo planter of today is in an equally natural manner attached to his old love, and prefers that it should not be displaced even to his own profit and it is possible even, like the Ceylon planter, he goes the length of looking down upon sugar. My impression is that the most effective way to fight the indigo battle to the issue is for the indigo planter to find something, such as I hope this sugar will prove, which will relieve any anxiety he may feel, and which at the same time will enable him to look upon his indigo cultivation as to some extent a by-product, You will then very soon find out how long the Badische Company can fight on those terms, and if he can "see" you, you will use the least expensive manure for sugar and thank heaven that he did not only see you, but break you before you could afford to let him.

We have gone into this business on a somewhat extensive scale for an experiment, in fact, what we have done already can only be regarded as the very strongest expression of our own confidence in the scheme. While the extent of the experiment has actually caused us no inconsiderable amount of anxiety, I consider we are repaid by the knowledge of the fact that there would have been serious danger, had it been on any smaller scale of its not meeting the requirement of the case. I have spoken of an experiment in sugar—I should rather have spoken of experiments, for we are growing and manufacturing sugar at five different places, and there has been at more than one of these places almost enough to have given a serious set back to the whole idea, had any individual case stood by itself for the whole experiment.

SATISFACTORY EXPERIMENTS.

At one place we have demonstrated to the planter that machinery cannot be run with an insufficient head of steam. At another, that cane planted in the native fashion, and by a mere scratching of the ground, and not afterwards properly cultivated, will entirely fail to stand such a season as the one which we are now experiencing. At another, we have demonstrated that only the best varieties of cane, even with cultivation of an approved character, will carry the plant through abnormal weather conditions, as at present obtaining. But at still another place, we have shown that where seed of native thin cane has been carefully selected, and where cultivation has been carried on in the modern way, in spite of abnormal weather conditions, we have got a result, I think, which would not be considered unsatisfactory in most countries in the world—for a start. I say for a start, because years of the highest expert attention have been devoted to the scientific cultivation of cane, to attain the highest possible of today.

But there is yet another and highly important point which we have made good. Whereas we have shown that, given fairly selected seed and proper cultivation, in an abnormal season, not unsatisfactory results can be got, we have shown at two distinct centres that seed of improved varieties, imported into the district, gives results of which any sugar-growing country in the world would be proud, and this in the face of the most unsatisfactory weather conditions for sugar tha have been experienced in this province of Behar for the last 25 years. I cannot but feel a certain satisfaction that we should have got so far as this within less than a year of the issuing of the Government report, which report confirmed in almost every particular the report of our own expert,

I had almost omitted to remark upon the engineering difficulties which have been overcome, I believe that no 2,000 tons of machinery have been ordered, transferred many thousand miles by sea, and come so far by rail, and been erected in anything like the time, and the engineers who pioneered this business are deserving of all praise, as anyone will no doubt agree who sees the progress of our principal works at Ottur. We have had many critics who have said that sugar was tried before. Mr O'Conor's very able report entirely answers this objection in the most conclusive manner.

A WORD OF CAUTION.

With my experience of today, I can find half a dozen other reasons why sugar failed before. Just one word of caution, and take it from me that sugar manufacturing is a chemical science. Reports have been current that our machinery is not producing a hard solid sugar as made by the native manufacturers. This solid, so-called, sugar, contains all the extraneous matter and dirt originally in the juice, and this coagulating hurries the solidification. We take all this dirt out before boiling—we can give a solid result thereafter, if we wished to—but the result is to caramelise or turn a large quantity of the cane sugar, and this is absolutely lost. I can only trust that what I have said justifies the claim which I have made upon your attention, and for the very hearty way in which the toast of your guests was responded to; it only remains to me to thank you on their behalf.—*Pioneer*, Jan. 25.

---

## CENTRAL TRAVANCORE PLANTERS' ASSOCIATION.

THE TEA DUTY PROTEST.

An extraordinary General Meeting of this Association was held at the Glenmary Bungalow on Saturday to protest against the suggestion of increasing the tea duty :—

*Present.*—Messrs F M Parker (Chairman), Hon'ble Mr. G L Acworth (by proxy), Messrs H M Knight, F Bisset, Buxton Laurie, G A Rutter, E Latter (by proxy), Mrs Munro (by proxy), Messrs H G Blandford (by proxy), R S Imray (by proxy) and D McArthur (Honorary Secretary.)

The Chairman in opening the meeting read a telegram from the Hon'ble Mr G L Acworth regretting his absence and then addressed the meeting as follows:—" Gentlemen, I have called this General Meeting of our Association for the purpose of asking you to protest against the suggestion of Sir Robert Giffen embodied in a letter to the *Times* and which, according to the telegrams, has been endorsed by that Journal, to increase the duty on tea by another two pence or three pence per lb. I can hardly take this suggestion seriously or think that it will have any chance of being accepted by Government. It is fully aware of the depressed condition of the industry and it knows that we are already saddled with a very heavy duty, out of all proportion to the value of the article on which it is levied. We cannot forget the Chancellor of the Exchequer's last Budget speech so full of sympathy, almost of hope that this year he would propose a reduction and not an increase of duty It is only natural that prior to the Budget all sorts of

schemes should be suggested to suit diverse interests but as this one hits us very hard I ask you to protest against its adoption to the utmost of your ability. Gentlemen, we are all loyal sons of the Empire, we are all ready to pay our share of the expenses of the war, but I ask you, are we not already doing so almost to breaking point? An increase of duty, and the subsequent check to production, would, be a burden too grievous to be borne, and our industry would be crippled to the point of extinction. In these days of Imperial Federation it is surprising, that British tea grown in British possessions with British capital by patriotic Britons, should be swooped down upon to provide an increased Revenue when almost every article of foreign production is admitted duty free. This may be sound political economy in theory, but in practice I would like to see free trade in British produce throughout the British Empire and a duty imposed on all foreign articles and on every letter of the words "Made in Germany." Gentlemen, I beg to move the following Resolution:— . .

"That this Association emphatically protest as a matter of vital interest against the suggestion to increase the British import duty on tea."

Mr H M Knight, in seconding the resolution, pointed out that the present duty of 6d per lb. was equivalent to 100 per cent on the value of Indan teas sold in 1900-01 and that the industry cannot bear any increased burden. Many gardens did not sell their teas in these two years at a price that recouped them from the cost of production, in fact made a considerable loss, and in consequence some concerns had closed their doors, and if the proposed tax is adopted many more must follow their example in S. India. Carried *em con.*

The Meeting then ended.—*Madras Mail*, Jan. 31.

## THE ROSE FOR MERRY ENGLAND.

Our American cousins are now much exercised in their minds as to what flower they shall adopt as a national badge. The discussions have been long and varied. Even now, no conclusion has been definitely arrived at. The same question has turned up here in connection with the Coronation ceremonial next June. We should not have thought that there was room for any dispute on the subject. The rose has been for centuries so entwined with our history that we should have supposed no other flower could have been budded on a British stock. The rose is said to have been the badge of Edward I. in the thirteenth century; in 1397 John of Gaunt bequeathed to the altar in St Paul's his coverlet of cloth of gold sprinkled with golden Roses. We had thought it possible that on one or more of the numerous shields on the tombs of the Black Prince and of Henry IV. in the Cathedral at Canterbury, a conventional representation of the Rose might have been found. Through the courtesy of the Dean, we are enabled to say that this conjecture is erroneous, and that neither on the tomb of the Black Prince, nor on his hauberk still preserved in the Cathedral, is there any representation of a Rose. Its connection with the houses of Lancaster and of York is, of course, known to all of us, and was forcibly recalled to mind last summer when a Rose show was held in the historic Temple Gardens. In Tudor times the Rose was constantly used as an architectural adornment, and may still be seen at Westminster, and many a similar fane.

From this point of view it is interesting to quote what Evelyn, writing in 1679, says: "For even the very Damask Rose itself, as my Lord Bacon tells us, Cent. 2, Exp. 659, is little more than an hundred years old in England." Compare this with what is said by Parkinson, writing in 1629. Parkinson mentions thirty sorts in his garden, everyone notably differing from the other.

But when the Rose was adopted as a national emblem, Canada, Australia, Tasmania, and New Zealand had not been discovered; and—except in Canada—there is not a native Rose in either colony; nor is there any part of South Africa, the West Indies, Mauritius, or Ceylon. Half the British Empire then has no Rose unless by introduction.

When we get a federated Greater Britain, it is clear we shall have some difficuly in fixing upon a flower that is common to all the component elements. This being the case, it will be best to disregard points of geographical distribution as pedantic in the circumstances, and to fall back on the old heraldic, conventional Rose as the floral badge for the whole empire.

The Hon. Mrs. Boyle, in her charming *Ros Rosarum —Dew of the Ever-living Rose*, cites from an old ballad some lines, which are so appropriate to the occasion, that no apology need be offered for quoting them. Alluding to the White Rose of York and the Red Rose of Lancaster, the ballad proceeds:—

"These roses sprang and budded fair,
  And carried such a grace,
That Kings of England in their arms
  Afford them worthy place.
And flourish may these Roses long,
  That all the world may tell
How owners of these princely flow'rs
  In virtues did excel.

To glorify these roses more,
  King Henry and his Queen
First placed their pictures in wrought gold
  Most gorgeous to be seen.
The King's own guard now wear the same
  Upon their back and breast,
Where love and loyalty remain,
  And evermore shall rest.

The red rose on the back is plac'd
  Thereon a crown of gold;
The White Rose on the breast is brave
  And costly to behold;
Bedeck'd most rich with silver studs
  On coat of scarlet red;
A blushing hue which England's fame
Now many a year hath bred."

The warders of the Tower still wear tunics embroidered in the manner here described.

But in spite of the claims of long descent on the part of the Rose, a claim is set up in some quarters for the Iris, which some say is the Fleur-de-Lys. Unfortunately for this contention, it is not yet settled whether the device is really intended to represent an Iris, a Lily, or a spear-head!

Again, Fleur de Louis is considered to have been the original name, and this has been converted into Fleur de Luce, Fleur de Lys, and Fleur de Lis. Prior, in his *Popular Names of British Plants*, mentions the legend that a shield charged with these flowers was brought to Clovis from heaven while engaged in battle against the Saracens. They were assumed by Louis VII. in 1137 as his device, and later on they were bestowed on Joan of Arc.

No doubt several of our monarchs did quarter of the Fleur-de-Lys on their coats of arms as a testimony of their rights in France, rights now happily long become obsolete, and consequently also the claim to quarter the Fleur-de-Lys.

Another claimant put forward for heraldic recognition is the Lily-of-the-Valley, a native plant of unsurpassed elegance and delicious fragrance, but having no claim whatever to be accepted as a national emblem. Much historical interest attaches to the rose and to the Fleur-de-Lys, but the Lily-of-the-Valley is totally devoid of any such relation. What the "Lily-of-the-Valleys" of the Canticles may have been we do not know, but we may be pretty sure it was not what we call the Lily-of the-Valley, which is not a native of Palestine.

The Christmas Rose puts forth nc claim to historical significance, but its lovely flowers, expanding at this season, are so beautiful, that they confer a right to the popular name Rose, although botanically they have nothing tc do with the genuine rose.

Whatever flowers he adopted for merely decorative purposes at the Coronation, we plead that as a matter of ceremonial usage, no other than the Rose of England be adopted.—*Gardeners' Chronicle*, Jan. 4.

## THE HUMUS OF SOILS.

A garden soil must contain in addition to the necessary mineral constituents of plants a suitable supply of available nitrogen or the plants cannot make the necessary growth requisite for full development of flowers and fruit. It has been found by analysis that one part of nitrogen in a soil will correspond to about 10 or 12 parts of humus. Any increase or decrease of the nitrogen in soils is followed by a corresponding increase or decrease of humus. The loss of humus and organic matter from a soil not only reduces the stock of nitrogen but also reduces the amount of available mineral-food as well. The decaying animal and vegetable matters present in all good soils produce acids which act upon the inert and inactive plant-food elements and render them available. The humates or organic products which are formed by the union of the organic acid products derived from the decay of the humus combined with the mineral matter of a soil form valuable plant food.

Experiments have shown that humate of lime is capable of being assimilated and utilised by plants. Potash, phosphoric acid and all of the mineral elements of plant-food when combined with humus and nitrogen constitute valuable forms of food for all kinds of garden crops.

The high fertility of old kitchen garden soils is due to the large store of humus. The loss of humus changes the physical properties of a soil, both as to colour, weight per cubic foot, and retention of soil-water. A loss of humus and vegetable-matter causes a lightness in soil-colour, an increase in density and compactness with a less capability to retain moisture. A dark-coloured soil becomes hotter in the sun's rays than a light coloured one; but at night all soils will cool to the same point.

Humus conserves the moisture of a soil, while a rotation of crops, the use of stable manure and the digging in of vegetable refuse conserves the humus. If the soil contains too much humus the vegatative system of plants becomes overfed by an excessive quantity of nitrogen luxuriance of foliage and stem-growth is encouraged, while flowers and fruit development are retarded. In general it may be said that an abundant supply of potash and phosphoric acid, especially the latter tends to increase fruitfulness, hardiness and firmness of leaves and stems; while an abundance of nitrogen and humus has a tendency to produce just the reverse conditions. While the plant cannot be at its best without a suitable supply of nitrogen and humus, plants which are grown chiefly for their fruits may easily be injured by an amount only slightly exceeding a sufficiency.

It has been found that the store of plant-food in a soil is of little value unless the physical conditions and the available moisture which it contains are also considered. This brings into prominence the question of proper tillage. No matter how fully the soil may be supplied with plant food if it does not furnish a comfortable home for the plant or if for considerable periods there is not enough moisture present to convey the plant-food to the roots, little benefit may be expected from the real or potential nourishment existing in the ground. Plants growing in a garden suffer oftener from a lack of moisture than they do from lack of soluble food. J. J. WILLIS, Harpenden, in *Gardeners' Chronicle*, Jan. 11.

## CINCHONA PLANTING IN BENGAL.

The Government made a profit of nearly R10,000 from its cinchona plantations in Bengal last year, a fact which reflects the greatest credit on those concerned with the working of the plantations. There was a very considerable increase in the demand for quinine at the Post offices.—*Madras Mail*, Feb. 3

## INDIAN PATENTS.

Applications in respect of the undermentioned inventions have been filed, under the provisions of the Inventions and Designs Act of 1888, in the office of the Secretary appointed under that Act :—

John Gilruth Gilruth, Engineer, Chetla, Alipore. A continuous action paddy (or other grain) combined boiler and dryer (or "conditioner.")

Henry Johnston, Engineer and Shipwright Surveyor, of the Port Office, Rangoon, Burma. A combined windlass and steering gear.

## PLANTING NOTES.

A "SIGHT FOR SAIR E'EN" has been provided for passers-by in the dreary month of January by the wall of a house close to the gates of Gunnersbury Park. This is entirely covered with Cratægus pyracantha, upon which is still left an ample crop of scarlet berries. Among the comparatively compact branches of this creeper Jasminum nudiflorum is running rampant, and the clear yellow of its fully-expanded flowers forms a charming contrast to the bright berries and green leaves of the Cratægus. It was not our fortune to see this beautiful sight on a fine day, but when the sun is shining the effect must be truly gorgeous.—*Gardeners' Chronicle*, Jan. 18.

RUBBER IN WEST INDIES.—Mr. James Pinnock, the well-known African merchant and traveller, of Liverpool, who is at present making a journey round the world, writes to a friend from Port of Spain, Trinidad. Of the rubber industry on the West Coast of Africa. Mr. Pinnock has had great experience, and he thinks that the cultivation in Dominica of this article is, or should be, one of the most important items in the future prosperity of the island. He mentions that he during the time he carried on business, imported large quantities of rubber from the most primæval forests in West Africa, produced and treated by entirely unsophisticated natives in the great African forests. The soil of a very large portion of this most fertile country, Mr. Pinnock says, together with its tropical climate and surroundings of water, appears to be most admirably adapted for the cultivation of the rubber. In his remarks on this subject, Mr. Pinnock asks:—"If the untrained and uncivilised natives (of what, until lately, has been known as 'Savage Africa') can produce rubber in such huge quantities, why not their more advanced brethren in the West Indies do the same?" In Liverpool, says a daily contemporary, Mr. Pinnock's suggestion with regard to the growing and cultivation of rubber in the West Indies is regarded as a very valuable one. One well-known gentleman, who thoroughly understands the importance of the matter, expressed the opinion that if rubber can be produced in the West Indies, it will bring back the islands to their former prosperous condition. Mr. Pinnock was a good authority on such a question, and had great practical experience in West Africa, where he resided for many years.—*India-rubber and Gutta-percha Trades' Journal*, Jan. 6.

# SHARE LIST.

ISSUED BY THE

## COLOMBO SHARE BROKERS' ASSOCIATION.

### CEYLON PRODUCE COMPANIES.

| Company | paid p. sh. | Buyers. | Sellers. | Transaction |
|---|---|---|---|---|
| Agra Ouvah Estates Co., Ltd. | 500 | — | 900 | — |
| Ceylon Tea and Coconut Estates | 500 | .. | — | — |
| Castlereagh Tea Co., Ltd. | 100 | — | — | — |
| Ceylon Provincial Estates Co. Ltd. | 500 | — | — | ... |
| Claremont Estates Co., Ltd. | 100 | — | — | — |
| Clunes Tea Co., Ltd. | 100 | — | 50 | — |
| Clyde Estates Co., Ltd. | 100 | — | — | -- |
| Doomoo Tea Co., of Ceylon Ltd. | 100 | 65 | — | — |
| Drayton Estate Co., Ltd. | 100 | — | .. | — |
| Eila Tea Co., of Ceylon, Ltd | 100 | — | 30 | — |
| Estates Co of Uva, Ltd. | 500 | 210 | — | — |
| Gangawatte Tea Co., Ltd. | 100 | — | — | — |
| Glasgow Estate Co., Ltd. | 500 | — | 1000 | — |
| Great Western Tea Co., Ltd. | 500 | 610 | — | — |
| Hapugahalande Tea Estate Co. | 200 | — | — | — |
| High Forests Estates Co., Ltd | 500 | — | 550 | — |
| Do part paid | 400 | — | 450 | — |
| Horrekelly Estates Co Ltd | 100 | 85 | — | — |
| Kalutara Co., Ltd., | 500 | — | 250 | — |
| Kandyan Hills Co., Ltd. | 100 | — | 45 | 45 |
| Kanapediwatte Ltd. | 100 | — | 85 | — |
| Kelani Tea Garden Co., Ltd. | 100 | .. | .. | — |
| Kirklees Estate Co., Ltd. | 100 | ... | 120 | — |
| Knavesmire Estates Co., Ltd. | 100 | 50 | 55 | -- |
| Maha Uva Estates Co., Ltd. | 500 | — | 350 | ... |
| Mocha Tea Co., of Ceylon, Ltd. | 500 | — | 700 | |
| Nahavilla Estate Co., Ltd. | 500 | 250 | 300 | — |
| Neboda Tea Co., Ltd. | 500 | — | 500 | — |
| Palmerston Tea Co., Ltd. | 500 | ... | 400 | — |
| Penrhos Estates Co , Ltd. | 100 | ... | 90 | — |
| Pitakanda Tea Company | 500 | — | ... | — |
| Pine Hill Estate Co., Ltd. | 60 | 35 | 40 | — |
| Putupaula Tea Co., Ltd. | 100 | ... | .. | — |
| Ratwatte Cocoa Co., Ltd | 500 | . | — | 120 |
| Rayigam Tea Co., Ltd. | 100 | ... | .. | — |
| Roeberry Tea Co., Ltd. | 100 | 70 | ... | — |
| Ruanwella Tea Co., Ltd. | 100 | .. | 40 | 40 |
| St. Hellier's Tea Co., Ltd, | 500 | ... | 500 | — |
| Talgaswela Tea Co., Ltd. | 100 | ... | 27·50 | -- |
| Do 7 per cent Prefs. | 100 | .. | 70 | — |
| Tonacombe Estate Co., Ltd, | 500 | .. | ... | — |
| Udugama Tea & Timber Co., Ltd. | 50 | ... | ... | — |
| Union Estate Co., Ltd. | 500 | .. | 110 | — |
| Upper Maskeliya Estates Co , Ltd. | 500 | 425 X DIV. | | 425 X DIV. |
| Uvakellie Tea Co., of Ceylon, Ltd , | 100 | ... | 67½ | 67½ |
| Vogan Tea Co., Ltd., | 100 | .. | 50 | — |
| Wanarajah Tea Co., Ltd. | 500 | 900 | 1000 | — |
| Yataderiya Tea Co., Ltd. | 100 | .. | 285 | — |

### CEYLON COMMERCIAL COMPANIES.

| Company | paid p. sh. | Buyers. | Sellers. | Transaction |
|---|---|---|---|---|
| Adam's Peak Hotel Co., Ltd. | 100 | ... | 30 | — |
| Bristol Hotel Co., Ltd. | 100 | — | 105 | ... |
| Do 7 per cent Debts | 100 | 107 | — | — |
| Ceylon Gen. Steam Navgtn Co., Ltd | 100 | — | 225 | — |
| Ceylon Superaeration Ltd. | 100 | — | 50 | — |
| Colombo Apothecaries' Co. Ltd. | 100 | 137½ | -- | 137½ |
| Colombo Assembly Rooms Co., Ltd. | 20 | 15 | .. | — |
| Do prefs. | 20 | ... | .. | — |
| Colombo Fort Land and Building Co., Ltd. | 100 | — | 85 | — |
| Colombo Hotels Company | 100 | — | 295 | 295 |
| Galle Face Hotel Co., Ltd. | 100 | 180 | — | 180 |
| Kandy Hotels Co., Ltd. | 100 | — | 117½ | — |
| Mount Lavinia Hotel Co., Ltd. | 500 | — | 300 | 280 |
| New Colombo Ice Co., Ltd. | 100 | .. | 165 | 160 |
| Nuwara Eliya Hotels Co., Ltd. | 30 | 30 | -- | . |
| Do 7 per cent prefs. | 100 | 107 | ... | 1 7 |
| Public Hall Co., Ltd. | 20 | 12½ | 14 | — |

### LONDON COMPANIES.

| Company | paid. p. sh. | Buyers. | Selles. | Transaction. |
|---|---|---|---|---|
| Alliance Tea Co., of Ceylon, Ltd. | 10 | .. | 8—9 | — |
| Anglo-Ceylon General Estates Co | 100 | ... | 55 - 60 | — |
| Associated Estates Co., of Ceylon | 10 | .. | 1½—2½ | - |
| Do. 6 per cent prefs. | 10 | .. | 3—5 | — |
| Ceylon Proprietary Co. | 1 | . | ¼ - ½ | — |
| Ceylon Tea Plantation Co., Ltd. | 10 | .. | 23¼ - 24 | — |
| Dimbula Valley Co., Ltd. | 5 | .. | 5—5½ | - |
| Do prefs | 5 | — | 5—6 | — |
| Eastern Produce & Estates Co. Ltd. | 5 | 3¼ | 3¼—3¾ | — |
| Ederapolla Tea Co., Ltd. | 10 | ... | 6—8 | — |
| Imperial Tea Estates Co., Ltd. | 10 | 4 | 4 4½ | — |
| Kelani Valley Tea Assen., Ltd. | 5 | ... | 3 - 5 | — |
| Kintyre Estates Co., Ltd. | 10 | ... | 6 8 | — |
| Lanka Plantations Co., Ltd | 10 | .. | 4 | — |
| Nahalma Estates Co.,Ltd. | 1 | ... | nom | .. |
| New Dimbula Co., Ltd. | 1 | ... | 2¾ -3 | .. |
| Nuwara Eliya Tea Estate Co., Ld. | 10 | — | 10 | — |
| Ouvah Coffee Co., Ltd. | 10 | .. | 6—7 | — |
| Ragalla Tea Estates Co., Ltd. | 10 | . | 11 -13 | — |
| Scottish Ceylon Tea Co.,Ltd. | 10 | - | 10 -15 | — |
| Spring Valley Tea Co., Ltd. | 10 | ... | 2—5 | — |
| Standard Tea Co., Ltd. | 6 | .. | 10—12 | .. |
| The Shell Transport and Trading Company, Ltd. | 1 | ... | 2⅞—3⅛ | ... |
| Ukuwella Estates Co., Ltd. | 25 | — | par | .. |
| Yatiyantota Ceylon Tea Co., Ltd. | 10 | — | 5¼ | — |
| Do. pref. 6 o/o | 10 | | 9 10 | — |

BY ORDER OF THE COMMITTEE

Colombo, Feb. 7th, 1902.

* Latest London Prices.

## RAINFALL RETURN FOR COLOMBO.

*(Supplied by the Surveyor-General.)*

| | 1897. | 1898. | 1899. | 1900 | Av of 31yrs. | 1901 | 1902 |
|---|---|---|---|---|---|---|---|
| | Inch | Inch | Inch. | Inch. | Inch. | Inch | Inch |
| January .. | 3·81 | 2·32 | 6·98 | 3·72 | 3·24 | 11·91 | 1·95 |
| February .. | 1·68 | 1·98 | 2·78 | 0·63 | 1·89 | 3·55 | 0* |
| March .. | 3·66 | 4·21 | 0·88 | 3·71 | 4·75 | 5·12 | |
| April .. | 10·97 | 22·81 | 6·66 | 15·12 | 11·43 | 8·71 | |
| May .. | 8·30 | 5·80 | 17·73 | 10·63 | 12·04 | 6·28 | |
| June .. | 10·14 | 10·94 | 9·23 | 7·83 | 8·35 | 5·93 | |
| July .. | 5·24 | 6·15 | 1·11 | 6·77 | 4·30 | 4·52 | |
| August .. | 9·09 | 0·97 | 0·62 | 7·35 | 3·79 | 0·46 | |
| September .. | 4·58 | 6·90 | 1·48 | 4·00 | 4·98 | 3·93 | |
| October ... | 4·71 | 20·60 | 12·99 | 9·47 | 14·36 | 3 91 | |
| Novemberr .. | 11·66 | 17·38 | 8·58 | 9·25 | 12·55 | 19·84 | |
| December .. | 8·89 | 3·05 | 4·44 | 5·2 | 6·35 | 1·70* | |
| Total.. | 82·73 | 103·11 | 73·48 | 83·68 | 88·03 | 75·86 | 1.95 |

* From 1st to 4th Feb. 0 inch, that is up to 9·30 a.m. on the 5th Feb.—ED. *C.O.*

## CEYLON TEA: MONTHLY SHIPMENTS TO UNITED KINGDOM AND ESTIMATE.

| | | | |
|---|---|---|---|
| Estimate for | Dec. | 1901—10,000,000 | lb. |
| Total Shipments | Do | 1901—12,000,000 | lb. |
| Do Do | Do | 1900—11,241,918 | lb. |
| Do Do | Do | 1899—11,076,842 | lb. |

[ESTIMATE for Jan. 1902—9½ to 10 million lb.]

| | | | |
|---|---|---|---|
| Estimate for | Jan. | 1902—9½ to 10 mill. | lb. |
| Total Shipments | Do | 1902—9,250,000 | lb. |
| Do Do | Do | 1901—12,617,540 | lb. |
| Do Do | Do | 1900—10,477,132 | lb. |

[ESTIMATE for Feb, 1902—8 to 8½ million lb.]

THE DEAF HEAR.—No. 479 of *the Illustrated World* of 626, Chiswick High Road, London, W., England contains a description of a remarkable Cure for Deafness and Head Noises which may be carried out at the patient's home, and which is said to be a certain cure. This number will be sent free to any deaf persons sending their address to the Editor,

## COLOMBO PRICE CURRENT.

*(Furnished by the Chamber of Commerc.)*

### EXPORTS

Colombo, Feb 3rd, 1902.

CARDAMOMS :—
All round parcel, well bleached per lb R1·50
Do. dull medium do. R1·30
Special assortment, 0 and 1 only do. R1·80
Seeds do. R1·35

CINCHONA BARK :—
Per unit of Sulphate of Quinine 8c—1½ to 3 o/o

CINNAMON :—
Ordinary assortment per lb. 53c.
Nos. 1 and 2 only per lb. 58c.
Nos. 3 and 4 only per lb. 47c.

CINNAMON CHIPS :—
Per candy of 560 lb R75·00

COCOA :—
Finest estate red ; unpicked per cwt R40·00
Medium do do do R35·00
Bright native unpicked and undried R32·50
Ordinary do do do R30·00

COCONUTS—(husked).
Selected per thousand R59·00
Ordinary ,, R50·00
Smalls ,, R41·50

COCONUT CAKE—
Poonac in robins f. o. b. per ton R75·00
Do in bags None

COCONUT (Desiccated).
Assorted all grades per lb 22c

COCONUT OIL—
Dealers' Oil per cwt R20·00. Business May delivery.
Coconut Oil in ordinary packages f. o. b. per ton R435·00. Business May delivery.

COFFEE.—
Plantation Estate Parchment on the spot per bus. None.
Plantation Estate Coffee f.o.b. (ready) per cwt — None.
Native Coffee, f.o.b per cwt.—None.

CITRONELLA OIL—
Ready do per lb.—48c

COPRA—
Boat Copra per candy of 560 lb. R64·75
Calpentyn Copra do do R64·75
Cart do do do R63·00
Estate do do do R64·75

CROTON SEED per cwt—R15·00

EBONY—
Sound per ton at Govt. depot—R190·00. Sale of the 2nd ultimo.
Inferior R125·00 Sale of the 2nd ultimo.

FIBRES—
Coconut Bristle No 1 per cwt R11·50
Do ,, 2 None
Do mattress ,, 1 3·50
Do ,, 2 2·00
Coir Yarn, Kogalla ,, 1 to 14·75
Do Colombo ,, 1 to 11·25
Kitool all sizes None
Palmyrah None

PEPPER—Black per lb. None

PLUMBAGO—
Large lumps per ton R550
Ordinary lumps do R550
Chips do R350 } Fine qualities scarce.
Dust do R210
Do (Flying) do R120 } More enquiry.

SAPANWOOD— per ton None.
SATINWOOD (ordinary) per cubic ft. None.
Do do per cubic ft. None.

| TEA— | High Grown Average. | Medium Average. | Low Grown Average. |
|---|---|---|---|
| Broken Pekoe and Broken | cts | cts | cts |
| Orange Pekoe per lb | 52 | 40 | 35 |
| Orange Pekoe do | 41 | 38 | 34 |
| Pekoe do | 37 | 35 | 30 |
| Pekoe Souchong do | 34 | 30 | 28 |
| Pekoe Fannings do | 31 | 28 | 23 |
| Broken mixed—dust, &c | 24 | 23 | 22 |

## CEYLON EXPORT AND FOR SEASONS 1901 AND 1902.

| COUNTRIES | Black Tea. | | Green Tea. | Coffee—cwts. | | | Cocoa | C'moms | Cinnamon | | Coconut Oil. | | Copra | Desiccated Coconut | Poonac. | Coconuts. | Plumbago. | | Fibre |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1902 lbs. | 1901 lbs | lbs. | Plantation | N'tive | Total. | cwts. | lbs | Bales lbs. | Chips. lbs. | 1902 cwt | 1901 cwts | cwts. | lb. | cwts. | No. | 1902 cwts. | 1901 cwts. | cwts. |
| U K. .. | 6851329 | 10888137 | 2405 | 234 | .. | 234 | 3487 | 21017 | 32552 | 1336 | 8572 | 18056 | .. | 323836 | .. | 295100 | 11019 | 8309 | 3579 |
| ,, Austria .. | 65 | 330 | .. | 1 | .. | 1 | ... | . | .. | 11200 | 1209 | 772 | .. | .. | .. | 5000 | ... | .. | .. |
| ,, Belgium ... | 71[illegible]9 | .. | ... | .. | .. | ... | 125 | ... | 10600 | 30800 | ... | 500 | 500 | 7650 | 7257 | 1 010 | 872 | 927 | 1516 |
| ,, France .. | 16589 | 20994 | ... | ... | ... | ... | . | | ... | | ... | .. | 1000 | ... | ... | .. | .. | ... | 101 |
| ,, Germany .. | 49556 | 33046 | ... | ... | .. | ... | 374 | 8346 | 27500 | 7914 | 20 | .. | 22[illegible]6 | 99848 | 4040 | 10010 | 2141 | 3455 | 453 |
| ,, Holland .. | .. | 11074 | ... | ... | .. | .. | .. | .. | .. | 11200 | .. | .. | .. | . | .. | .. | ... | ... | 161 |
| ,, Italy .. | 520 | 669 | .. | .. | .. | .. | 1 | .. | 1200 | 16800 | 607 | .. | .. | ... | 10 | ... | .. | ... | .. |
| ,, Russia .. | 612958 | 727093 | ... | ... | ... | ... | ... | .. | .. | .. | ... | .. | 2060 | .. | .. | ... | .. | . | ... |
| ,, Spain .. | 5[illegible]0 | – | .. | ... | .. | .. | .. | ... | 15000 | 11200 | .. | .. | ... | .. | .. | ... | ... | ... | .. |
| ,, Sweden .. | 10655 | 11315 | ... | .. | .. | .. | 100 | .. | .. | .. | ... | ... | ... | . | .. | . | ... | ... | ... |
| ,, Turkey .. | 4018 | 98[illegible] | .. | ... | ... | .. | .. | . | .. | ... | .. | | .. | .. | ... | .. | .. | | .. |
| ,, India .. | 43498 | 1[illegible]99[illegible] | ... | .. | ... | .. | . | 8336 | .. | . | 298 | 29[illegible]9 | | . | . | 14400 | 114 | ... | .. |
| ,, Australia .. | 526824 | 409283 | .. | 15 | ... | 15 | 32 | ... | 1800 | 3920 | ... | . | ... | 32507 | ... | .. | ... | .. | 40 |
| ,, America .. | 96841 | 138235 | ... | ... | .. | ... | .. | ... | ... | .. | 499 | 6004 | ... | .. | ... | ... | ... | 17410 | .. |
| ,, Africa .. | 28714 | 9713 | .. | ... | .. | .. | ... | 1506 | .. | .. | ... | ... | .. | 8[illegible]90 | .. | 70400 | .. | ... | 159 |
| ,, China .. | 140222 | 4625 | ... | 6 | ... | 6 | .. | .. | 200 | 112 | .. | .. | . | ... | .. | – | 304 | .. | .. |
| ,, Singapore .. | 7337 | 5410 | ... | | .. | | 1125 | ... | ... | .. | ... | ... | ... | .. | ... | ... | ... | ... | 87 |
| ,, Mauritius .. | 900 | 3[illegible]00 | .. | .. | .. | ... | .. | .. | .. | .. | ... | .. | ... | .. | .. | .. | .. | .. | .. |
| ,, Malta .. | 7000 | 24900 | .. | . | ... | .. | ... | .. | ... | .. | ... | .. | .. | ... | .. | .. | ... | .. | .. |
| Total export from 1st Jan. to 27th Jan 1902 | 8404635 | 12456415 | 2405 | 256 | .. | 256 | 5244 | 39505 | 88352 | 94482 | 11205 | 28281 | 5706 | 472[illegible]31 | 11308 | 404920 | 14453 | 30101 | 6036 |

## MARKET RATES FOR OLD AND NEW PRODUCTS.

*(From Lewis & Peat's Fortnightly Price Current, London, December 23rd, 1901.)*

| | QUALITY. | QUOTATIONS |
|---|---|---|
| ALOES, Soccotrine cwt. | Fair to fine dry | 44s a [illegible]0s |
| Zanzibar & Hepatic ,, | Common to good .. | 20s a 60s |
| ARROWROOT (Natal) lb. | Fair to fine | 5½d a 6[illegible]d |
| BEES' WAX, cwt. | | |
| Zanzibar & Bombay { White ,, | Good to fine | £6 a £7 10s |
| Yellow ,, | Fair ,, | £6 a £6 12s 6d |
| Madagascar ,, | Dark to good palish | £6 a £6 1[illegible]s |
| CAMPHOR, Formosa ,, | Crude and semi refined | 165s a [illegible]5s |
| Japan ,, | Fair average quality | 175s a 18[illegible]s |
| CARDAMOMS, Malabar lb | Clipped, bold, bright, fine | [illegible]s 9d a [illegible]s [illegible]d |
| | Middling, stalky & lean | 1s 5d a 1s 7d |
| Ceylon. Mysore ,, | Fair to fine plump | 1s 4d a [illegible]s |
| | Seeds | 2s a 2s 2d |
| ,, Tellicherry ,, | Good to fine .. | 2s 6d a 3s |
| | Brownish | 1s 6d a [illegible]s |
| ,, Long ,, | Shelly to good .. | [illegible]d a 2s [illegible]d |
| ,, Mangalore ,, | Med brown to good bold | 2s 3d a 3s 3d |
| CASTOR OIL, Calcutta ,, | 1sts and 2nds .. | 3¼d a 3½d |
| CHILLIES, Zanzibar cwt. | Dull to fine bright ... | 3[illegible]s 6d a 4[illegible]s |
| CINCHONA BARK.— lb. Ceylon | Ledgeriana Orig. Stem | 3d a 5½d |
| | Crown, Renewed | 5d a 7d |
| | Org. Stem | 3¾d a [illegible]½d |
| | Red Org. Stem | 3⅜d a 4¼d |
| | Renewed | 3d a 5¾d |
| | Root | [illegible]¾d a 4d |
| CINNAMON, Ceylon 1sts per lb | Ordinary to fine quill | 9½d a 1s 6d |
| 2nds | ,, ,, | 8½d a 1s 5d |
| 3rds | ,, ,, | 8½d a 1s 4d |
| 4ths | ,, ,, | 8d a 11d |
| Chips | ,, ,, | 2½d a 10d |
| CLOVES, Penang lb. | Dull to fine bright bold | 4½d a 9½d |
| Amboyna .. | Dull to fine | 5d a 6d |
| Zanzibar and Pemba } | Good and fine bright | 4½d a 4¾d |
| | Common dull to fair | 4[illegible]d a 4⅝d |
| Stems .. | Fair | 1⅝d |
| COFFEE Ceylon Plantation ,, | Bold to fine bold colory | 92s 6d a 12[illegible]s |
| | Middling to fine mid .. | 80s a 10[illegible]s |
| | Low mid. and low grown | |
| | Smalls | 40s a 60s |
| Native | Good ordinary | 40s a 55s |
| Liberian ,, | Small to bold | 3[illegible]s a 40s |
| COCOA, Ceylon | Bold to fine bold | 67s 6d a 90s |
| | Medium and fair | 60s a 6[illegible]s |
| | Native | 52s 6d a 62s 6d |
| COLOMBO ROOT ,, | Middling to good | 7s a 15s |
| COIR ROPE, Ceylon ton | | nominal |
| Cochin ,, | Ordinary to fair . | £13 1[illegible]s a £18 |
| FIBRE, Brush | Ord. to fine long straight | £16 a £19 |
| Cochin ,, | Ordinary to good clean | £20 a £24 |
| Stuffing ,, | Common to fine | £7 a £9 |
| COIR YARN, Ceylon ,, | Common to superior | £15 a £30 |
| Cochin ,, | ,, ,, very fine | £12 a £32 |
| do. ,, | Roping, fair to good | £10 a £14 10s |
| CROTON SEEDS, sift. cwt. | Dull to fair | 15s a 20s |
| CUTCH ,, ,, | Fair to fine dry | 23s a 35s |
| GINGER, Bengal, rough ,, | Fair | 40s |
| Calicut, Cut A ,, | Good to fine bold | 9[illegible]s a 1 0d |
| B & C ,, | Small and medium | 5[illegible]s a 80s |
| Cochin Rough ,, | Common to fine bold | 45s a 52s |
| | Small and D's | 42s 6d a 45s |
| Japan ,, | Unsplit | 44s |
| GUM AMMONIACUM ,, | Sm. blocky to fine clean | 15s a 45s |
| ANIMI, Zanzibar ,, | Picked fine pale in sorts | £10 7s 6d a £18 |
| | Part yellow and mixed | £7 a £8 |
| | Bean and Pea size ditto | 70s a £9 2s 6d |
| | Amber and dk. red bold | £5 10s a £6 7s 6d |
| | Med. & bold glassy sorts | 80s a 100s |
| Madagascar ,, | Fair to good palish ... | £4 a £8 |
| | ,, ,, red ... | £4 5s a £9 |
| ARABIC E. I. & Aden ,, | Ordinary to good pale | 35s a 58s |
| Turkey sorts ,, | | 40s a 45s |
| Ghatti ,, | Pickings to fine pale ... | 12s 6d a 35s |
| Kurrachee ,, | Good and fine pale ... | 52s 6d a 55s |
| | Reddish to pale selected | 30s a 40s |
| Madras ,, | Dark to fine pale ... | 20s a 35s |
| ASSAFŒTIDA ,, | Clean fr. to gd. almonds | 60s a 137s 6d |
| | Ord. stony and blocky | 6s a 25s |
| KINO ,, | Fine bright | 1s 3d |
| MYRRH, picked ,, | Fair to fine pale | 90s a 115s |
| Aden sorts ,, | Middling to good | 50s a 80s |
| OLIBANUM, drop ,, | Good to fine white | 35s a 55s |
| | Middling to fair | 25s a 35s |
| pickings ,, | Low to good pale | 18s a 23s |
| siftings ,, | Slightly foul to fine | 18s a 22s |
| INDIARUBBER, Assam lb | Good to fine | 2s a 2s 3d |
| | Common to foul & mxd. | 7d a 1s 6d |
| Rangoon | Fair to good clean ... | 2s a 2s 4d |
| Borneo | Common to fine | 1s a 2s 3d |

| | QUALITY. | QUOTATION. |
|---|---|---|
| INDIARUBBER (contd.) | | |
| Java, Sing. & Penang lb. | Foul to good clean .. | 8d a 2s 3d |
| Mozambique ,, | Good to fine Ball .. | 2s 6d a 3s 1½d |
| | Ordinary to fair Ball ... | 1s 10d a 2s 6d |
| | Low sandy Ball .. | 1s 3d a 1s 7d |
| | Sausage, fair to good . | 2s 6d a 2s 11d |
| | Liver and Livery Ball . | 2s a [illegible]s |
| Nyassaland | Fair to fine ball .. | 2s 2d a 2s 9¼d |
| Madagascar | Fr to fine pinky & white | 2s 3d a 2s 6d |
| | Fair to good black .. | 2s a 2s 6½d |
| | Niggers, low to fine .. | 7d a 1s 9d |
| INDIGO, E.I. | Bengal— | |
| | Shipping mid to gd violet | 3s 8d a 4s 6d |
| | Consuming mid. to gd. | 3s 2d a 3s 6d |
| | Ordinary to mid. | 2s 10d a 3s 1d |
| | Mid. to good Kurpah | 2s a 2s 6d |
| | Low to ordinary | 1s 6d a 1s 10d |
| | Mid. to good Madras | 2s a 2s 10d |
| MACE, Bombay & Penang per lb. | Pale reddish to fine | 2s a 3s |
| | Ordinary to fair | 1s 4d a 1s 11d |
| | Pickings | 1s 3d a 1s 4d |
| MYRABOLANS, Madras } cwt | Dark to fine pale UG | 5s a 6s |
| | Fair Coast | 4s 6d a 4s 9d |
| Bombay ,, | Jubblepore | 5s a 6s |
| | Bhimlies | 4s 3d a 7s |
| | Rhajpore, &c. | 4s a 5s 6d |
| Bengal ,, | Calcutta | 3s 6d a 5s |
| NUTMEGS— lb. | 64's to 57's | 2s 4d a 2s 6d |
| Bombay & Penang ,, | 110's to 65's | 1s a 2s [illegible]½d |
| | 160's to 130's | 6d a 1s |
| NUTS, ARECA cwt. | Ordinary to fair fresh | 3[illegible]s a 50s |
| NUX VOMICA, Bombay per cwt. | Ordinary to middling | 4s a 5s 6d |
| Madras | Fair to good bold fresh | 7s a 10s 6d |
| | Small ordinary and fair | 5s a 6s 9d |
| OIL OF ANISEED ,, | Fair merchantable | 5s |
| CASSIA ,, | According to analysis | 2s 9d a 3[illegible] |
| LEMONGRASS ,, | Good flavour & colour | 5d a 5⅛d |
| NUTMEG ,, | Dingy to white | 1½d a 3d |
| CINNAMON ,, | Ordinary to fair sweet | 3¼d a 1s 6d |
| CITRONELLE ,, | Bright & good flavour | 9½d a 10d |
| ORCHELLA WEED—cwt | | |
| Ceylon ,, | Mid. to fine not woody.. | 10s a 12s 6d |
| Zanzibar. ,, | Picked clean flat leaf .. | 10s a 14s |
| | ,, wiry Mozambique | 10s a 11s |
| PEPPER - (Black) lb. | | |
| Alleppee & Tellicherry | Fair to bold heavy .. | 6d a 6⅛d |
| Singapore .. | Fair ... ... ... | 6d 3·16d |
| Acheen & W. C. Penang | Dull to fine ... ... | 5¾d a 6⅛d |
| PLUMBAGO, lump cwt. | Fair to fine bright bold | 30s a 35s |
| | Middling to good small | 2[illegible]s a 32s |
| chips | Dull to fine bright .. | 9s a 15s |
| dust | Ordinary to fine bright | 3s 6d a 8s |
| SAFFLOWER | Good to fine pinky . | 65s a 75s |
| | Inferior to fair . | 40s a 60s |
| SANDAL WOOD— | | |
| Bombay, Logs ton. | Fair to fine flavour .. | £20 a £50 |
| Chips ,, | ... ... ... .. | 5s a £8 |
| Madras, Logs ,, | Fair to good flavour .. | £20 a £50 |
| Chips ,, | Inferior to fine ... | £4 a £8 |
| SAPANWOOD Ceylon ,, | Fair to good .. | £5 a £5 10s |
| Manila ,, | { Rough & rooty to good | £4 10s a £5 15s |
| Siam ,, | bold smooth .. | £7 |
| SEEDLAC cwt. | Ord. dusty to gd. soluble | 105s a 110s |
| SENNA, Tinnevelly lb | Good to fine bold green | 5d a 1s 0¼d |
| | Fair greenish | 3½d a 4¾d |
| | Common dark and small | 1d a 3d |
| SHELLS, M. o'PEARL | | |
| Bombay cwt. | Bold and A's | £2 10s a £3 7s 6d |
| | D's and B's | |
| | Small ... | |
| Mergui ,, | Small to bold .. | £6 7s 6d a £6 15s |
| Mussel ,, | Small to bold ... | 22s a 55s |
| TAMARINDS, Calcutta... | Mid. to fine bl'k not stony | 8s a 10s |
| per cwt. Madras | Stony and inferior .. | 4s 6d a 6s |
| TORTOISESHELL— | | |
| Zanzibar & Bombay lb. | Small to bold dark mottle part heavy | 16s a 2[illegible]s |
| TURMERIC, Bengal cwt. | Fair .. | 17s a 18s |
| Madras ,, | Finger fair to fine bold bright | 16s a 24s |
| Do. ,, | Bulbs .. | 14s a 18s |
| Cochin ,, | Finger . | 17s 6d a 18s |
| | Bulbs ... | 12s 6d |
| VANILLOES— lb. | | |
| Mauritius } 1sts | Gd. crysallized 3½ a 9 in | 5s a 23s 6d |
| Bourbon ... } 2nds | Foxy & reddish 3½ a 8 ,, | 4s a 11s |
| Seychelles 3rds | Lean and inferior ... | 2s a 6s |
| VERMILION lb. | Fine, pure, bright ... | 3s 2d a 3s 3d |
| WAX, Japan, squares cwt | Good white hard ... | 35s a 36s |

# THE AGRICULTURAL MAGAZINE, COLOMBO.

*Added as a Supplement Monthly to the "TROPICAL AGRICULTURIST."*

The following pages include the Contents of the *Agricultural Magazine* for February :—

Vol. XIII.] FEBRUARY, 1902. [No. 8.


## A VISIT FROM AN AMERICAN AGRICULTURIST.

MR. David G. Fairchild, Agricultural Explorer Department of Agriculture, United States of America, left Ceylon on the 16th January after spending some time in the island. Mr. Fairchild has previously visited Ceylon no less than three times. The object of his present visit is to enquire into the cultivation of the Mangosteen with a view to introducing this much esteemed fruit into Porto Rico, where local conditions are considered favourable to its growth, so as to ultimately supply the American markets with the produce. Our late visitor thinks the possibilities of the mangosteen, as a table fruit in the West practically unlimited, and believes that fabulous prices will be paid by the moneyed men of the West for fine specimens of fruit sold in baskets of half-a-dozen or so. Mr. Fairchild paid visits to the plantations of the late Sir Henry Dias at Haluloya and Mr. H. W. Wright at Mirigama, to see the exact environments of the trees, and held conferences with the latter gentleman and Mr. H. L. Daniel of Lenawatte estate, Padukke, (who are credited with knowing more about mangosteen cultivation than any one else in the island). Regarding the habits of the tree, the method of propagating it, and all details connected with its cultivation, a good deal of valuable information was gleaned from these two sources; and a number of photographs taken on Mr. Wright's estate and coloured drawings of the fruit by a local artist will be reproduced in illustrating the *brochure* which Mr. Fairchild intends to publish when he has completed his investigations.

Though chiefly concerned with the Mangosteen, our visitor was nevertheless interested in some of the other products of cultivation in the island. Among these the mango received his close attention, and from the grounds of the School of Agriculture, Colombo, where the various species of mango are well represented, Mr. Fairchild took ten cuttings each of the "Rupee," "Jaffna" and what was given the distinguishing name of the "Thurston" mango—a variety which is not known to be found growing elsewhere, and was planted in the grounds some 30 or 40 years ago by a Mr. Thurston who presided over the institution then known as the Industrial School. From the buds found on these cuttings Mr. Fairchild expects to be able to reproduce the abovementioned varieties of the mango on American stocks. For those who may desire to preserve cuttings for budding purposes, Mr. Fairchild has kindly drawn up the following directions :—Have made a cylindrical tin case, 10 in. long, 2 in. in diameter, with a well-fitting cap 2 in. long, in which to send the cuttings through the post. This case should be fitted in a cloth sack before despatching. Cut scions about 10 in. long, making sure they have good buds on them. Dip the cut ends in collodion or melted bee's wax, wrap each scions in a strip of light tin foil, and wrap these again in oiled paper. Do not pack more than four or five in each case with slightly moistened saw dust. Be careful to put the address on a tag.

Mr. Fairchild is also interested in finding drought-resisting wheat and other plants, with which object he is visiting the arid region around the Persian Gulf where such wheat is reported to be growing. In Ceylon what took his fancy in this connection was *Eleusine coracana*, ordinarily known as kurakkan, the common millet of the "dry or chena cultivation" of the island. Unfortunately the search for kurakkan fields and seeds was thought of after our visitor had returned to Colombo, a day or two before his departure, but we were able to discover a low-country chena for Mr. Fairchild through the help of Mr. H. D. Lewis, Sub-Inspector of Schools, who succeeded in procuring a quantity of seed for transmission to America.

Mr. Fairchild was struck with the absence of any attempt on the part of the Government or of orgainsed agricultural bodies, to facilitate the propagation of cultivated crops, whereby only the best varieties could be selected for growing. In the case of dicolytedonous plants the perpetuation of the best varieties, when discovered, was ensured by the practice of budding and grafting, which are considered the only reliable means of making plants "breed true," and must not be neglected if the best results in produce are to be secured. He instanced in proof of the value of the methods of propagation the dissemination of the seedless variety of orange known as the Washington Navel. The advantage of budding and grafting, as regards early maturity is well-known, but it was further pointed out that by these methods it was possible to ensure that the produce of the several trees in a plantation should be practically the same in quantity and quality, and, in the case of season crops, that such produce should be borne all at the same time so as to be handled and marketed at once, as has been done in almond cultivation in America. In this connection Mr. Fairchild was surprised to observe how many kinds of coconuts were found growing side by side in one plantation, and he counted no less than fourteen different varieties on a single estate. The only way to secure one perfect type of nut, as regards size, shape, weight, development of kernel, &c, is by selection of seed. As in the case of the pedigree wheat, selection of seed in the monocotyledon does what budding or grafting does for the dicotyledon. Mere selection of seed from a tree bearing good fruit crops does not suffice, for the simple reason that the fertilization of the flowers are not under control. A good tree, therefore, while it may produce good fruit need not necessarily reproduce a good tree through its fruit. There is thus no alternative but to control fertilization if the fruit of a tree is required to "breed true." Without doing so the orange from a good tree may quite possibly reproduce a sour orange tree or even a variety of lemon, lime or pumelo, while under the same circumstances a coconut from a selected tree may reproduce a variety different from itself. This remark is of course not intended to discredit selection of fruit without control of pollination. Such selection undoubtedly helps to secure a uniformity of good varieties in a plantation, but only partially so. What then is to be done to complete the means for the end in view? Only this, that the inflorescence of the coconut palm should be protected before it is, so to speak, ripe for fertilization, by gauze veiling or other means which will prevent cross fertilization taking place. Here we come upon the principle which underlies the practice of breeding among animals, and the principle stands in the case of vegetable reproduction as well. Who among our planters of the present day will be prepared to practice this complete means of selection, even with the tempting prospect of having all his trees uniform in developement and productiveness, and the nuts of standard size, shape and quality? "The thing," says Mr. Fairchild "has been done over and over again in the West, and will come to be done in Ceylon as regards coconuts before many years are past." We can only say that we hope so.

Some of our readers will now guess what Mr. Fairchild's explanation is regarding the difference in the developement and productiveness of trees often growing side by side on the same land and even raised from the same *jat* of seed nuts. Making all allowance for differences in environment and treatment, it lies he says in the one word *heredity*. The moral therefore obviously is, practice selection by controlling fertilization if you would have uniform excellence.

With the School Gardens scheme Mr. Fairchild was in the greatest sympathy, and it was only want of time that prevented him paying a visit to one of these gardens which he was very anxious to see. He thought there was much to be done by introducing budding and grafting among the people through the agency of village schools, and was kind enough to give us a note of introduction to Mr. L. H. Bailey, Professor of Horticulture in the Agricultural Department of the United States, through whose help we hope to be supplied with all requirements for carrying on and teaching these methods of propagation, of which Mr. Fairchild gave practical demonstrations at the School of Agricalture.

On his recommendation we are endeavouring to procure buds of what he considers the best varieties of plantain, viz., "Pisung Radja," "Pisung Radja Sere" and "Pisung Mas" from Java, as well as sets of the following yams from Jamaica: "Horn," "Chinese" and "Yampie," the last of which he speaks of as the "best in the world."

Altogether the visit of Mr. Fairchild was as full of interest to us as it was to him, and we shall look forward with pleasure to his next visit which will not unlikely be about the middle of the year.

RAINFALL TAKEN AT THE SCHOOL OF AGRICULTURE DURING THE MONTH OF DECEMBER, 1901.

| | | | | | |
|---|---|---|---|---|---|
| 1 | Sunday .. | Nil | 17 | Tuesday .. | ·05 |
| 2 | Monday ... | Nil | 18 | Wednesday... | ·90 |
| 3 | Tuesday ... | Nil | 19 | Thursday .. | ·08 |
| 4 | Wednesday .. | ·16 | 20 | Friday ... | Nil |
| 5 | Thursday ... | Nil | 21 | Saturday .. | Nil |
| 6 | Friday .. | Nil | 22 | Sunday ... | ·62 |
| 7 | Saturday .. | Nil | 23 | Monday ... | Nil |
| 8 | Sunday .. | Nil | 24 | Tuesday ... | Nil |
| 9 | Monday ... | Nil | 25 | Wednesday... | Nil |
| 10 | Tuesday ... | Nil | 26 | Thursday ... | Nil |
| 11 | Wednesday .. | Nil | 27 | Friday ... | Nil |
| 12 | Thursday ... | ·07 | 28 | Saturday ... | Nil |
| 13 | Friday ... | Nil | 29 | Sunday ... | Nil |
| 14 | Saturday .. | Nil | 30 | Monday ... | ·03 |
| 15 | Sunday .. | Nil | 31 | Tuesday ... | Nil |
| 16 | Monday .. | Nil | 1 | Wednesday... | Nil |

Total... 1·91
Mean... ·06

Greatest amount of rainfall registered in 24 hours on the 18th Dec., 1901, ·90 inches.

Recorded by C. DRIEBERG.

RAINFALL TAKEN AT THE SCHOOL OF AGRICULTURE DURING THE MONTH OF JANUARY, 1902

| | | | | | |
|---|---|---|---|---|---|
| 1 | Wednesday .. | Nil | 17 | Friday ... | Nil |
| 2 | Thursday ... | Nil | 18 | Saturday ... | Nil |
| 3 | Friday ... | 1 02 | 19 | Sunday ... | 0·43 |
| 4 | Saturday ... | ·03 | 20 | Monday .. | Nil |
| 5 | Sunday ... | Nil | 21 | Tuesday ... | Nil |
| 6 | Monday ... | Nil | 22 | Wednesday... | Nil |
| 7 | Tuesday ... | ·07 | 23 | Thursday ... | Nil |
| 8 | Wednesday ... | Nil | 24 | Friday ... | Nil |
| 9 | Thursday ... | Nil | 25 | Saturday ... | Nil |
| 10 | Friday ... | Nil | 26 | Sunday ... | Nil |
| 11 | Saturday ... | Nil | 27 | Monday ... | Nil |
| 12 | Sunday ... | Nil | 28 | Tuesdsy ... | Nil |
| 13 | Monday ... | Nil | 29 | Wednesday... | Nil |
| 14 | Tuesday ... | Nil | 30 | Thursday ... | Nil |
| 15 | Wednesday ... | Nil | 31 | Friday ... | Nil |
| 16 | Thursday ... | Nil | | | |

Total... 1·55
Mean... ·05

Greatest amount of rainfall registered in 24 hours of the 3rd Jan., 1902, 1·02 inches.

Recorded by C. DRIEBERG

## OCCASIONAL NOTES.

*Erratum.*—In our December issue, page 55, line 1st, coloum line 19, from the bottom for "part" read "per cent."

Mr. George Weerakoon, Mudaliyar of Welaboda Pattu, Matara, contributes the following interesting note on the subject of Kiül Lands which was the subject of an article by Mr. Frank Modder, of Kurunegala, in the *Agricultural Magazine*, Vol. XI., No. 12 :—

Mr. Modder's letter *re* Kiül is interesting, see p. 103 of your journal for June, 1900. *Vapid*—that is having the strength or essence evaporated—would be the meaning of the word. Kiül land is to be found nearly in every tract of paddy-fields, but not in extensive plots. Every goiya knows what it is. The soil may be well tilled and even manured, but the water left stagnant any length of time assumes a vermillion hue, and any stray seed germinating becomes a stunted plant and gives no yield. An absence of salt is one of the causes attributed. It is within my observation that a small paddy-field at Dandeniya was proverbially barren and was hardly cultivated in a decade. Four years back a citronella still was opened in proximity to this field. Of course the refuse, and chiefly the ash, found its way to the field. Kiül has completely gone, and this field is now regularly cultivated returning 10-fold, which is equal to any fertile field here. Another paddy land at Kekanadure-turned fertile by the same agency—is in the mouth of every body in the village. You will wonder how the ash of an arrack distillery differs from that of a citronella distillery? Well, in the latter the used-up grass is dried and used again for fuel. It is largely employed in manuring paddy-fields and sells 25 cts. a cart load.

The following table shows the record of the Rainfall taken at the School of Agriculture during the past year:—

| | | Total. | Mean. |
|---|---|---|---|
| January | ... | 7·48 | ·24 |
| February | .. | 2·64 | ·94 |
| March | .. | 8·94 | ·28 |
| April | ... | 8·91 | .29 |
| May | ... | 7·34 | ·23 |
| June | ... | 6·79 | ·21 |
| July | ... | 6·45 | ·20 |
| August | ... | 1·27 | ·04 |
| September | ... | 3·61 | ·10 |
| October | ... | 6·29 | ·20 |
| November | ... | 21·26 | ·70 |
| December | ... | 1·91 | ·03 |
| Total | .. | 82·89 | ·28 |

A gentleman from Ceylon who is making a tour of the Australian Colonies, sends us the following chatty account of his impressions :—During the last fortnight I have had some experiences of real bush life. I left Sydney on the Saturday before Christmas, and by a coasting steamer I reached Melbourne on the following Monday night ; then after 175 miles of a train journey I arrived atmy destination on Christmas Eve. After duly celebrating the great day with friends whom I had come to know, I began a round of visits to what are called "Station Farms." One holding I visited was 20,000 acres in extent, only 100 acres of which are put under wheat per annum, the balance being left for sheep and a few horses. The large acreage is not surprising, considering that every head of sheep needs an acre and a half in this part of the country—often more. The scarcity of the water and the bush fires which take place

occasionally render farming a precarious industry at the best. As for the climate, it is like Colombo without the humidity. The Mercury stood at 95° at 9 o'clock in the morning, and it was just nice and pleasant; at 1 p.m. it rose to 107°. The orchard where I was visiting was laden with fruit; and the verandah of the house covered up to the eaves with grape vines, and there were thousands of clusters of huge bunches on them. I have been driving in a "sulkey" to see sheep stations at the rate of 12 miles an hour. It is pretty hot outside, the thermometer in the sun registering 125°. Driving some 15 miles out and back again I did not meet a single passenger on the road nor even a house by the roadside. The ground being all open country, one could see round for miles and miles. The Galle Face on a pretty large scale with a gum tree here and there at the rate of say 5 trees to the acre will give you some idea of the country through which I drove. The green was all parched up and the wheat fields after the harvest had a stubble as dry as the grass. Such is Australia in the North at this time of the year. The yield of wheat is 4 or 5 bags to the acre, and a bag is 4 bushels which, selling at 2/6 to 3/- makes the return about 30/- per acre for all the trouble and anxiety incidental to wheat cultivation. After my visit to North Victoria I went on to Gipsland in the South, travelling first by rail and then by boat along the river. In the wider parts of the water the banks are beautifully wooded on both sides, diversified by fen and moor. Flights of ducks and teal disturbed in their haunts among the rushes gave evidence of the country being a paradise for the sportsman. But this was nothing to the surprise I had later on. As we entered a lagoon I noticed half-a-dozen large-sized birds paddling away to avoid our boat. These turned out to be cygnets, and you might have killed a couple with a large pole. They are not protected by law and may be shot here, but ducks are better eating. Further on the water was dotted over with black swans in such numbers that when they flew they reminded me of the flying foxes swarming in the Peradeniya Gardens. They remain unmolested here. At one of the halting stations a sportsman joined us with a bag of blue-winged duck that was astonishing; the slaughter must have been wholesale like that in an English or Scotch preserve. On my arrival at Cunningham I went out to sea with the fishers, who getting into a lagoon drag their nets in the early morning. In a couple of hours they had fish enough to fill 20 boxes or more. They are put in ice and sent on to Melbourne. When too plentiful they are carefully transferred to large net bags all the while kept under water, and brought into kraals, which are called "paddocks" at Cunningham, and set free. There they are put by for stormy days, for when the fishermen cannot put out to sea, they net their homebred stock for the market. There is much to be done in this business by a man who could invest in a fishing smack with an engine so as to be independent of the winds. The forests about here are not unlike Ceylon forests, but to clear with white labour would cost £20 an acre. Land is locked up here, but a man who can get together a selection of 1,000 acres at a penny per acre per annum, to be paid for in 20 years, could leave a fortune for posterity, though he could only eke out a living for himself and family while he lived.

---

A correspondent of the *Indian Agriculturist*, writing about the wood of *Anthocephalus Cadamba*, says:—"It is sold in Calcutta in pieces, 6 ft. long, 9 in. broad, and one inch thick at the rate of Rs. 8 or 10 per hundred, mango wood of the same dimensions selling for Rs. 30 per hundred. As it is cheaper than mango wood it may be of great economic value as a material for packing." He speaks of it as a wood which grows rapidly with little care and exertion, which can be planted on roadsides &c. for shade, and utilized for packing purposes without resorting to the destruction of fruit-yielding trees such as the mango. The Sinhalese name of this tree is Embul-bakmi (Tamil, Vellaidampa,) and it is found growing in the low-country up to an elevation of 2,000 feet, occurring in Kurunegala, Pussellawa, and Alagalla, and other places. Dr. Watt refers to its fast growth, mentioning that during the first two or three years the rate is about 10 feet per year, the girth increasing at the rate of one inch in a month. After 10 or 12 years, however, the growth becomes very slow. The wood is described as white with a yellowish tinge, soft and even-grained; weight about 40 lbs. per cubic foot. It is used in India for building, and in Assam and Cachar for tea boxes. Cunningham mentions that it is employed for beams and rafters on account of its cheapness and lightness, and that it is suitable for joiner's work, though rather brittle. If less heavy he thinks it would be much valued, for gun-stocks.

---

Among the economic plants being grown in the Colombo Stock Garden are the following introduced from India:—*Trigonella corniculata*, a variety of Fenugreek, the seeds of which are used as a condiment and also medicinally; *Rumex vesicariws*, sorrel or bladderdock, used as a vegetable both raw and cooked; *Peecedanum graveolens* (*Anethum sowa*) or dill, of which the fruit and leaves are used as a flavouring agent in cookery and the seeds considered of considerable medicinal value; *Chenopodium album* or white goosefoot, eaten as a pot-herb and green vegetable. Of the last Prof. Church says: "The leaves are rich in mineral matters, particularly potash salts; they likewise contain a considerable amount of albuminoids and of other compounds of nitrogen." The seeds are said to be superior to buckwheat.

---

## SUCCESSFUL USE OF TOWN DRAINING AS MANURE.

The satisfactory disposal of town drainage is always a vexed question, and any information on this subject is to be welcomed. Mr. W. H Moreland, C.S., Director of the Department of Land

Records, and Agriculture, North-Western Province and Oudh contributes a most valuable note on the possibility of utilising what is always an objectionable byproduct, and shows how it can be made to take the place of expensive fertilising agents in the raising of successive crops of useful produce. The experiment with town drainage as a manure was undertaken at Meerut, where there appear to have been special facilities for the successful carrying out of the trial. Given the same facilities elsewhere, there is no reason why other Municipal bodies should not suite all prejudice against the use of town sewage for agricultural purposes, and follow the example of Meerut. We now give the text of Mr. Moreland's note on the subject:—

The following particulars regarding the utilization for agricultural purposes of the town drainage of the Meerut Municipality are published in the hope that they may be of interest to the members of other Municipalities, and also to landowners who own towns or bazaars provided with a system of street drainage.

In Meerut the street drains discharge into open main drains which flow for some distance through agricultural land on their way to the water-courses which ultimately receive the drainage. The contents of these drains consist mainly of street-rubbish, sullage-water and the like, diluted by the water with which the drains are flushed. Night-soil is carted away and trenched, but much urine also finds its way into the drains. The drainage is a thick sluggish liquid, of a dark colour and offensive smell, and containing large quantities of impurities both suspended and dissolved.

Until about 1895 no use was made of this drainage as there appears to have been an impression that it was unsuitable for application to land. In that year the Collector, acting on the advice of the Agricultural Chemist to the Government of India, started some experiments at the Demonstration Farm to test the value of the drainage when applied in the liquid form to various common crops. The results were startlingly successful, and the cultivators in the neighbourhood of the Farm were quick to see the advantages of this new method of manuring. Within two years of the beginning of the experiments, cultivators were found willing to pay a fee of two rupees for each lift set up to raise the drainage from the channels to their fields; the number of lifts in use has latterly been about 45, bringing into the Municipality about 2,701 per annum, the whole of which is clear profit; and the annual charge per lift has recently been raised from Rs. 6 to Rs. 12 without, it is understood, restricting the application of the drainage. Of course it would be preferable to charge according to the area irrigated, and in Meerut most of the advantages derived from the drainage have been intercepted by the landowners.

The water is raised from the drains by lifts of the type ordinarily used with wells, and is applied to the land exactly like irrigation-water. The ordinary method of cropping land treated with this drainage water is to take three crops in the year, maize, potatos and tobacco being grown successively without any manure other than that supplied by the drainage, which serves also for irrigation. It would scarcely be possible to devise a more exhausting rotation, but the manurial constituents of the drainage enable it to be maintained without loss of fertility. The Superintendent of the Cawnpore Farm, who has close practical knowledge of high farming, writes: "The condition of the potato and tobacco crops which I saw on good many fields was all that could be desired, and was simply excellent; no potato crop was seen which could have been put at less than seven or eight tons of tubers per acre. The oral reports of the cultivators about the maize were equally favourable. The gross money value of the three crops taken together may be put at not less than Rs. 400 and as much as Rs. 500 or even more, per acre per annum."

Enquiries show that formerly this land received heavy dressings of poudrette, costing about Rs. 50 to Rs. 100 a year; the replacement of this manure by drainage water, costing twelve rupees for as many acres as can be watered by one lift is an obvious saving to the cultivator, and the landowner has not been slow in claiming a share of the advantage. The rents of the land treated in this way have risen all round and in some cases have doubled; they now range from Rs. 50 to Rs. 100 per acre.

The facts enumerated above show better than any results of analysis or artificial experiment the value as manure of this material which previously ran to waste; on sanitary grounds, too, it seems preferable that the drainage water should be run on to a large area of absorbent land, rather than that it should stagnate in the drains. From this point of view the best results will be obtained if the land to be irrigated is a light, rather sandy loam, and this is just the sort of a land where such an application should be most profitable to the agriculturists.

The following hints may be of service where it is desired to imitate the success attained in Meerut.—

The first step should usually be to take a small area of land near the drains and raise fodder crops on it: these are remarkably successful in Meerut, and the produce can generally be fed to the conservancy cattle. When cultivators see the crops so raised they will probably want to try the drainage, and it will be wise to let them have the use of it free of charge for at any rate one season. When they have become accustomed to it a charge can be introduced. The exact nature of the charge must depend on the arrangements which can be made by the Municipality. The system in Meerut is particularly simple, but as has been shown most of the benefit goes to the landowner: an acreage rate is fairer to all parties if the area irrigated can be easily ascertained: while the most profitable system of all would be to hold the irrigable land directly and let it out by auction to cultivators.

In conclusion it may be noted that in some cases it is possible the use of drainage water may lead to a slight decrease in the demand for poudrette: but the manure supply is nowhere excessive, and

there will usually be ample scope for using all the available poudrette on land which lies out of reach of the drains.

## MEMS ABOUT MILK.

There is probably no substance of which so many analyses have been made as milk, and consequently its composition and variations of composition are pretty well known.

The following table, based on the authority of Keith and Richmond, gives the average composition of pure new milk: Fat 4·0, proteids 3·6, sugar 4·5, ash 0·7, total non-fatty solids 8·8, water 87·2.

The fat in milk is ofcourse what confers on it its riches. The sugar is a special variety to which the name of lactose has been given. It differs from cane sugar in that it is far less sheet, and hence it is not so powerful a flavouring agent as the latter. The proteid matter, like the white of egg, has no very pronounced taste, but yet it confers on milk a fullness and roundness of flavour, which a simple solution of lactose in water would not possess. New milk thus gives richness through its fat, sweetness through its sugar, and what may be called mellowness through its proteids. Separated milk is practically new milk less its fat.

The composition of new milk has been indicated in the analysis already quoted, but these figures must not be received as by any means the lowest obtainable from undoubtedly pure samples. For the purposes of the Food and Drugs Adulteration Act, the limits in England have recently been adopted of 3 per cent fat and 8·5 per cent solids not fat. In the case of a milk falling below these limits, the onus of proof of its purity lies with the vendor. But a direct estimate of value is of more importance than knowing whether or not a particular sample of milk passes the limits of the public analyst. Thus milks containing respectively 3 and 4 per cent of fat, would so far as the fat is concerned, be passed as free from adulteration; but it is obvious that the former sample has three-fourths the value of the latter. For some years this subject of the valuation of milk has engaged the attention of Mr. William Jago F.C.S., F.I.C., who suggests, and has for some considerable time employed, a standard of valuation worked out on the following lines:—From an examination of a considerable number of commercial milks an average conventional standard of quality was first determined, the aim being not to go so low as the Government limit for adulteration, but to take figures which a buyer might reasonably demand to be reached in milks supplied to him. These were ultimately taken as being for new milk. Total solids 12·5, fat 3·5, non-fatty solids 9·0.

Where both new and separated milk are marketable products it would be possible to value the constituents, thus: Taking the market value of new milk at 10*d.* per gallon, and separated milk at 2½*d.* per gallon, and the difference between the quality of the two as being an excess of 3·2 per cent fat in new milk, then the excess of fat must be given a value of 7½*d.*, and in the same proportion 3·5 per cent fat would be worth 8·2*d.* From this the value of the conventional standard samples can be expressed in terms of their constituents, this is, in new milk 3·5 per cent fat=8·2*d.*, 9 per cent non-fats=1·8*d.* or 10*d.* the gallon.

If the value of the standard be called 100, then the value of any sample can from the analysis be expressed in terms of percentages of the standard. For instance, the 3·5 of fat would be represented by the standard percentage 82 (*i.e.*, of the total of valuable constituents) and 9·0 non-fatty solids by the standard percentage 18, This will enable two tables to be drawn up for comparative valuation of fat and non-fatty solids in terms of the standards.

We give below the standard figures and those in three other cases for the purposes of comparison:—

| Description. | Composition. | Value in terms of stand. | Relative value per gallon. |
|---|---|---|---|
| 1. Mr. Jago's conventive standard: | | | |
| Fat ... | 3·5 | 82·00 | |
| Solids not fat | 9·0 | 18·00 | |
| | 12·5 | 10·000 | 10·0*d* |
| 2. Present Goverument limit: | | | |
| Fat ... | 3·0 | 70·29 | |
| Solids not fat | 8·5 | 17·00 | |
| | 11·5 | 87·29 | 8·7*d* |
| 3. Very rich milk watered: | | | |
| Fat ... | 4·3 | 100·72 | |
| Solids not fat | 8·1 | 16·20 | |
| | 12.4 | 116·92 | 11·7*d* |
| 4. Uusweetened milk diluted to three times its volume: | | | |
| Fat ... | 3·5 | 82·00 | |
| Solids not fat | 8·2 | 16·40 | |
| | 11·7 | 98·40 | 9·8*d* |

Looking at No. 3, it will be seen that the milk though of the highest value in terms of the standard, shows nevertheless evidence of having been watered, and would probably be made the subject of a prosecution if analysed for the purpose of the Food and Drugs Act. The public analyst being concerned simply with adulteration, while the commercial user is more vitally interested in the question of actual value.

In ascertaining the value of condensed milks it is usual to dilute them to three times their original volume. Then such a milk as No. 4 is, as nearly as possible, of the same degree of concentration as the standard milk.

[We are indebted for the information in the above to Mr. William Jago's lectures on the Chemistry of Confectioner's Materials and Processes, delivered before the Society of Arts last November.—Ed. *A.M.*]

## DISTOMATOSIS.

Veterinary Capt. H. Pease, Principal of the Veterinary College, Lahore, draws attention to the occurrence of this disease among cattle and buffaloes in India, in a note contributed to *The Agricultural Ledger*. The writer's investigations into the disease were undertaken as the result of serious mortality occurring in the vicinity of the Collair lake in the Madras Presidency. Since that outbreak the disease was observed to be more or less prevalent wherever lowlying swamps were found to occur, particularly in such country as is subject to periodic inundations.

Some years ago the dry cattle and growing animals belonging to the Government Dairy herd were removed to the premises known (by name only) as the Model Farm at Kanatte, with the result that many of the stock were attacked by and succumbed to an affection which there seems to be little doubt, from the description of the disease given in Capt. Pease's note, was Distomatosis. As a result the use of the premises referred to as pasture land for the Government Dairy herd had to be abandoned. The Model Farm is just such an area as is described above, where Distoma would find a congenial habitat.

We give below the more useful portion of Dr Pease's note for the benefit of our readers :—

*Most marked Symptoms.*—The most marked symptoms of this disease are gradual emaciation, unhealthy appearance of the skin, watery condition of the mucous membranes, and what is more especially noticed by the people, the appearance of œdemata on the dewlap, and sometimes also in the sub-maxillary space and under the abdomen. The skin becomes dry and the animal hidebound. Digestion is deranged, rumination and the action of the bowels irregular, the animal sometimes being constipated and at others suffering from diarrhoea. These symptoms gradually increase in intensity, and diarrhoea becoming marked death supervenes from exhaustion at between two and four months after the first symptoms have been noticed.

*Post-mortem appearances.*—The following *post-mortem* appearances may be observed in the buffalo and ox. Body extremely emaciated, the skin hidebound and dry; dropsical effusions into the subcutaneous tissues, the fat replaced by a gelatinous-looking material. All the tissues are pale and flabby. Liver greatly enlarged, all ducts and gall bladder filled with large flukes. Over 100 have been removed from the gall bladder. The bile black in colour, duct dilated.

*The Parasite.*—The parasite causing the disease is *Fasciola hepatica angusta*. Considerable interest attaches to the parasite which causes this disease. Its occurrence has not previously been recorded in this country. It has, however, been described by Raillet in 1895 from specimens taken from Cattle slaughtered at St. Louis, Senegal. Blanchard thinks it identical with *Fasciola gigantea* of the giraffe. Laoss has described under the name of *Fasciola Egyptiaca*, a parasite occurring in *Bos taurus* and *Bos bubalus* in Egypt which Blanchard considers identical with the fluke we are at present dealing with. The peculiar features of this fluke are its great length as compared with its breadth : it is a long and narrow and flat fluke. Raillet's specimens measured from 26 to 38 milimetres in length and were from 6 to 8 milimetres broad, or roughly from one to one and a half inches long and a quarter of an inch broad. All the specimens I have are well over an inch long and $\frac{1}{6}$th broad. The parasites when freshly taken are of a flesh colour and semi-transparent. They present all the characters of Fasciola. The intestines are branched and ramified. The body tapers in front so as to form a cephalic prolongation at the end of which the mouth is situated. The acetabulum opens very close to this on the ventral surface,; it is of fair size and salient, with a triangular orifice the base anterior: the body then rapidly gains its greatest breadth which gradually tapers towards the tail narrowing the inferior extremity being rounded. The integument is covered with small spines, especially on the ventral surface and in front. The genital pore is situated a little in front of the acetabulum, it often shows the ejaculatory canal evaginated in the form of a penis. The eggs which may easily be obtained by opening the uterus in front of the ventral opening are ovoid and relatively long. The shell is very thin, and one may often observe a small opercule, and at the other a slight, more or less irregular elevation. The size of the eggs seems to vary from 143 to 150 $\mu$. in length and 82 to 87 $u$. in breadth. Altogether there is not much difficulty in distinguishing this worm owing to its great length and narrow breadth.

## HOW TO PREPARE SEED BEDS.

I wish to say in the beginning that improved methods do not imply more labour, but they do imply more painstaking. It means the taking advantage of favourable conditions and creating conditions that are needed, and more than that, it means the getting of exact results, leaving nothing to chance. It is not necessary to give the many reasons suggested to show that plant beds well burned give the best results, except to say that it destroys the vegetable and insect life, and permits the plant to occupy the entire soil undisturbed. Select for your seed bed fresh land if possible on a hill slope where it will not be shaded, and near water not subject to overflow, as the land will be moist and need no watering. Black soil is to be preferred as it absorbs a greater degree of heat. Clear the ground of undergrowth and stone, and then put on a layer of brush and leaves to the thickness of 2 or 3 feet, and then on the top put wood and logs, covering it well over, so that when it is burned it will leave a heavy bed of coals.

The ground should be burned until it is a red or brick dust colour, in order to destroy all seeds and insect life, and so as to completely pulverize the soil. Do not burn when the ground is wet. When it is cool rake off all unburned wood but allow the ashes to remain on the bed, and then spade it up to the depth of 6 inches, being careful to reverse the soil. It should be then well

chopped with a hoe (or mammoty) and raked until the ground is thoroughly pulverized and the ashes well mixed with the soil, all sticks, roots and stones being removed.

Do not make the beds too narrow or they will get too dry; 6 feet is a very good width, but they may be as long as desired. It is better to have the plants too thin than too thick, as crowded plants grow weak and spindly, having no strength to overcome changed conditions, and when transplanted many of them die. They do not start to grow readily and are more subject to the ravages of cut-worms and other pests, causing many missing plants, making your garden very irregular in growth, and entailing much extra work in the end. But if your seeds are thinly sown the plants grow stocky, with good roots, and are strong and healthy growers, requiring less moisture when transplanted. They grow up readily, soon getting out of the way of pests, and you have a more uniform field.

If you desire to test the vitality of your seed before sowing, take a few in your fingers and sprinkle them on a hot stove; if they are good they will pop and crackle, but if not they will burn and crumble away. When sowing small seeds, mix them with cornmeal or slacked lime, as this will show on the bed, and you can see what you are doing. Lime is preferred, as it is a good fertiliser. After sowing do not rake, but tramp or pat in the seed with the back of a spade.

Do not sow all your seed at once, but at intervals of two weeks, that you may have plants of the proper size for transplanting when wanted; sow more than you are likely to need, that you may be able to select the strongest and best plants. In order to keep your plants free from disease and insects, and to get the very best results, it is necessary to canvas your beds. Take boards and set them on edge all around the bed, driving stakes on either side to keep them in place, and thus form a box around it, closing the joints with earth so as to make them insect-proof. The boards should come 5 or 6 inches above the top of the bed. Drive a row of nails on the outside of the box, 10 or 12 inches apart, all around, leaving I inch projecting; have a sheet made of the thinnest cheese cloth, the size of the bed, with holes around the edges to correspond with the nails driven into the box; stretch this sheet over the bed, slipping the holes in the edges over the nails. If the bed is large, lay small poles across the box frame at short distances, to keep the covering from sagging. Be sure to get the very thinnest cloth, that light and air may penetrate.

This covering usually stays on all the time until the bed is abandoned; but watch your plants, and, if they do not appear strong and healthy, you can remove the covering for a time. Make a ditch around the bed to carry off the water during rainy weather. If it is necessary at any time to water the plants, it should be done about sundown, the covering laid off, and, as soon as the watering is finished, replaced.

It is best to draw the water for this purpose in the forenoon, and let it stand in the sun and get warm, as cold water chills both the plants and the soil. It will be found that a canvas-covered bed retains the moisture better than any other, and also induces a more uniform temperature.

[The above directions are by Mr. R. S. Nevill from the *Queensland Agricaltural Journal* of March, 1898, referred to in our issue for December last.--ED. *A. M.*]

## PLANT LIFE.

[A SERIES OF SIMPLE LECTURES INTENDED FOR A CLASS OF JUNIOR STUDENTS.]

### LECTURE IV.

As I have already said it is with the soil that we generally connect plants, and indeed it is from the soil that the important part of the food of plants is drawn. This is done through the roots. I must here impress upon you an important fact, namely, that the food of plants which is drawn from the soil is taken up only in a liquid form. Now it is not to be supposed that all the necessary food is already in that form; some of it may be and some not. As you may be aware some substances are soluble in water, but some require the aid of other substances called solvents to dissolve them. Now the water in the soil invariably contains carbonic acid gas dissolved in it, the gas being produced by the decomposition of organic matter in the soil and brought into it in other ways. But the important point for you to remember is that water containing carbonic acid has a greater dissolving power than pure water. We may therefore expect to find a certain proportion of plant food already in a state of solution in the water in the soil and ready to be taken up by the roots. But there is also a good deal of the food of plants that requires to be dissolved out of the solid particles which compose soil, and this dissolving action is carried on by what is known as the acid sap present in the roots. By the aid of this acid sap which contains more powerful solvents than carbonic acid, plants are able to attack and dissolve the solid food particles present in the soil and utilize them for their nutrition. The process by which these liquids enter the roots of plants may be spoken of as absorption.

You must not suppose that everything in the soil is plant food, no more than every form of vegetation is food for animals. The necessary elements of plant food are distributed throughout the bulk of the soil and form by no means a large proportion of it. We speak of soils being fertile or unfertile according to the proportion of these necessary ingredients of plant food present in the soil. The soil we may look upon as the "element" in which the plant exists and flourishes, the greater bulk of it being required for fixing the plant in position so that its roots may travel through it in search of those ingredients which constitute the food of the plant. In addition to the solid matter of the soil, moisture or water must be present so that these necessary food ingredients may be dissolved in it and be absorbed into the plant in the form of solutions. These solutions are weak, that is to say there is comparatively a small quantity of food taken up

with a large proportion of water. It will therefore strike you that there would be an excess of water taken into the plant which will have to be drained off, or removed, after it has performed the function of conveying food from the soil into the plant. And this is so, for the excess of water over and above what is required by the plant passes out of the plant through the stomata as water vapour. This process is called transpiration.

A plant in a healthy state has its cells full of moisture, this condition keeping the plant "turgid," while a plant which lacks moisture, owing to transpiration going on more rapidly than absorption (as is the case in very dry hot weather) is said to become "flaccid." Hence it is that we see the foliage of plants and trees drooping and having a withered appearance during dry seasons but freshening up again after a fall of rain. For the same reason herbaceous garden plants which are shallow rooted and cannot secure the necessary supply of water from the soil require to be watered in dry weather, to prevent them withering off.

## OBITUARY.

Sir Henry Gilbert, F.R.S.—Sir H. Gilbert, the distinguished agricultural chemist and lifelong colleague of the late Sir John Bennet Lawes in the Rothamsted agricultural experiments, died on Monday, December 23rd, at his residence at Harpenden, St. Albans. Joseph Henry Gilbert, son of the Rev. Joseph Gilbert, and his wife Ann Taylor, of Ongar, was born at Hull in 1817. He studied in the laboratory of Professor Thomas Thomson at Glasgow University, and then proceeded to University College, London, where he attended the lectures of Professor Thomas Graham, and worked in the laboratory of Dr. Antony Todd Thomson, where J. B. Lawes, three years' Gilbert's senior, was also a pupil. He next went to the University of Giessen to study chemistry under Liebig, and there he took the degree of Ph. D. In 1843, Gilbert, at the age of twenty-six, became associated with Lawes, and assumed control of the chemical laboratory at the Rothamsted experimental station, Harpenden. The collaboration of these two pioneers in the field of scientific agricultural research lasted for fifty-seven years, and was only terminated by the death of Sir John Lawes on August 31st, 1900.

Sir Henry Gilbert was elected a member of the Society of Arts in 1855; and in 1893 the Albert gold medal was awarded to Sir John Lawes, and a like medal to Dr. Gilbert, "for their joint services to scientific agriculture, and notably for the researches which, throughout a period of fifty years, have been carried on by them at the Experimental Farm, Rothamsted." These medals were presented to the two recipients on February 23rd, 1894, by H.R.H. the Prince of Wales (President of the Society) at Marlborough House. In 1893 Dr. Gilbert received the honour of kinghood.

## FOOD GRAINS AND FODDERS.

*The Agricultural Ledger*, No. 10 of 1901 consists of a report by Dr. Leather, Assistant Agricultural Chemist to the Government of India on the chemical composition of Indian Food Grains and Fodders. Among the food grains treated of are some of those cultivated in this Island, and it will therefore be of interest to our readers to know something about the chemical composition and food value of these products. We are a little disappointed to find that though wheat and barley are included in the report, paddy or rice are omitted. We have little doubt, however, that the missing crop will find a place in the second edition which it is intended to publish shortly.

The following introductory remarks by Dr. Leather are important to a correct understanding of the results of analyses that follow:—

An accurate knowledge of the chemical composition of the Food crops of any country is of importance. In the case of India, the information of this nature, which has been available in the past, is very limited. On the other hand the number of crops of different natural orders is larger than in most countries, and that of varieties of the same crop is correspondingly greater. Consequently, the chemical analysis of only a few specimens of each of these varieties would entail a work of very considerable magnitude. Such, for the present, is not being attempted. If, however, the chief characteristics of the composition of the principal crops is determined, a want which is experienced by those who are studying Indian agriculture will be in part supplied.

Regarding the methods of analysis a few words may be usefully added. These are not quite uniformly the same in all countries, and consequently the published analyses of food stuffs are not always comparable in details. The following notes are therefore made.

*Moisture.*—This has been determined in all cases by drying in an air-oven at about 100° c.

The *oil* has been extracted from the *air-dry* sample with rectified, but not desiccated, ether.

The ether extract has usually only been determined in the grain, in which case it may be assumed to be almost entirely oil.

In the green fodders and straw or *bhusa* of crops, the matter soluble in ether includes largely other substances than oil, such as wax, chlorophyl or even alkaloids in some cases. It has, therefore, been generally omitted from the analysis of these materials.

*Albuminoids.*—In some of the older samples, the proportion of albuminoid nitrogen was not separately determined, and for these the amount of total nitrogen has been multiplied by the usual factor 6·25 and the product entered as Albuminoids. All such have been marked with an *. In most of the samples the albuminoid nitrogen was separated by Retthousen's method (precipitation with Capric hydrate). In a few other cases Church's method was employed. As will be seen, nearly the whole of the nitrogen in grain exists as albuminoids; it is only in fodders that any very marked divergence exists between the amount of total and albuminoid nitrogen.

*Soluble Carbohydrates.*—This term is applied in England to those component parts of food stuffs which are not separately determined.

In cereals and pulses it includes principally starch, but in other cases, such as some of the oil seeds, there is but little starch ; its place being taken by such substances as pectin or mucilage.

*Woody Fibre.*—This includes principally cellulose, but any lignin which is present in the grain or fodder is included.

*Soluble Mineral Matter.*—Most of the samples were very clean and free from earthy admixture. But since some extraneous earth was usually present and difficult to remove thoroughly, the soluble part of the "ash" or mineral matter has been stated separately, and the other insoluble portion, which consists principally of the silica natural to the grain or fodder has been entered in the next column. Usually grain contains very little silica, and if any earthy matter was adhering to the sample, its presence is at once indicated. But the straws and grasses contain high proportions of silica as an integral part of their normal composition. Earth or dust also usually adheres to these fodders, which is only partially removed on the threshing floor. Information regarding the composition of the ash will be supplied later.

| PRODUCT. | Source. | Moisture. | Oil. | Albuminoids. | Soluble Carbohydrates. | Woody Fibre. | Soluble Mineral Matter. | Sand and Silica. | Total Nitrogen. | Albuminoid Nitrogen. |
|---|---|---|---|---|---|---|---|---|---|---|
| Arachis hypogoea—ground nut | — | 4·70 | 49·25 | 29·09* | 13·21 | 1·65 | 2·15 | ·05 | 4·65 | — |
| Cocos nucifera—Coconut cake or poonac ... ... | Poona | 7·72 | 16·53 | 13·62 | 44·57 | 12·45 | 4·65 | ·46 | 3·31 | 2·17 |
| Eleusine coracana—Kurakkan grains ... ... | Do | 9·38 | 1·38 | 5·37 | 78·46 | 2·47 | 2·47 | ·47 | ·95 | ·86 |
| Panicum miliare—Menéri grain ... ... | Do | 7·95 | 4·11 | 6·81 | 67·26 | 7·63 | 2·16 | 4·08 | 1·18 | 1·09 |
| Panicum miliaceum—Varagu grain .. ... | Do | 8·57 | ·09 | 9·38 | 64·21 | 6·30 | 2·50 | 3·95 | 1·52 | 1·50 |
| Paspalum scrobiculatum—Amu grain ... ... | Do | 8·01 | 3·36 | 5·81 | 70·06 | 8·47 | 1·34 | 2·95 | 1·00 | ·93 |
| Pennisetum typhordeum—Kumbu grain (average of 5 analyses) .. ... | Do | 8·51 | 5·41 | 9·19 | 74·01 | ·77 | 1·74 | ·33 | 1·56 | 1·45 |
| Phaseolus mungo—Mun seeds | Do | 9·48 | 1·83 | 23·56 | 56·39 | 4·42 | 4·02 | ·30 | 4·03 | 3·77 |
| Phaseolus radiatus—Ulundu seeds .. .. | Do† | 11·87 | ·70 | 16·08 | 54·35 | 3·39 | 2·45 | 1.16 | 2·90 | 2·57 |
| | Do | 8·14 | ·99 | 18·50 | 59·11 | 4·33 | 4·51 | 4·42 | 3·24 | 2·96 |
| Setaria italica—Tanahal seeds | Do | 7·95 | 4·54 | 10·37 | 69·19 | 5·22 | 1·44 | 1·49 | 1·68 | 1·66 |
| Arachis hypogoea—Groundnut kernels ... ... | — | 4·70 | 49·25 | 29·09* | 13·21 | 1·65 | 2·15 | ·05 | 4·65 | — |
| Cajanus indicus—Dhall seeds (average of 2 analysis) ... | Poona | 8·21 | 1·48 | 19·08 | 61·53 | 5·72 | 3·70 | ·25 | 3·40 | 3·05 |
| Cicer arietinum—Kadala seeds (average of 4 analysis) ... | Do | 9·45 | 4·49 | 18·12 | 57·86 | 7·05 | 2·84 | 7·17 | 3·03 | 2·96 |
| Sorghum vulgare—Karal iringu seeds (aver. of 9 analysis) | Various Source | 10·76 | 4·18 | 9·55 | 72·27 | 1·31 | 1·76 | ·26 | 1·61 | 1·51 |
| Panicum maximum—Guinea grass (average of 2 analysis of green fodder) .. | Poona | 67·47 | ·94 | 2·25 | 16·53 | 7·26 | 2·23 | 3·31 | ·47 | ·36 |
| Sesamum indicum—Gingelly seed (average of 6 analysis)... | Various Source | 4·69 | 48·25 | 20·98 | 14·38 | 4·45 | 5·56 | ·99 | 3·42 | 3·01 |
| Dolichos biflorus—Kollu seeds | Poona | 7·45 | ·89 | 20·06 | 60·62 | 4·57 | 4·34 | 2·07 | 3·74 | 3·21 |

† Mr. S. H. Collin's Analysis.